Products finishing

CLEANING
PLATING
POLISHING
FINISHING

AUGUST 1952

Saving Nickel

Lea Copper-Glo

Something New in Bright High Speed Copper Plating

The Ronal Bright Copper Process* using Lea Copper-Glo is the answer to the platers' prayers because it answers the problem of extreme nickel shortages.

Lea Copper-Glo makes it practicable to plate properly prefinished steel and die-castings *directly* with chromium without any intermediate buffing operation. It makes it possible for you to forget your nickel worries.

The user of Lea Copper-Glo enjoys numerous advantages as for example:

OPERATING

- Brilliant ductile deposits
- High current density with 100% efficiency
- Exceptional throwing power
- No wetting agents required
- Direct, interrupted or periodic reverse current

COST SAVINGS

- Reduces tank plating time due to high speed operation. (Hull cell bright current density range 10-60 amp./ft.²)
- Reduces rejects whether followed by bright nickel or otherwise; since it contains no wetting agents
- Reduces brightener costs to a few cents/100 gallons of plating solution per day

The Ronal Bright Copper Process using Lea Copper-Glo can be fitted into your plant operating cycle. Regular cyanide or Rochelle Copper baths can be readily converted to obtain these advantages. Write for further information.

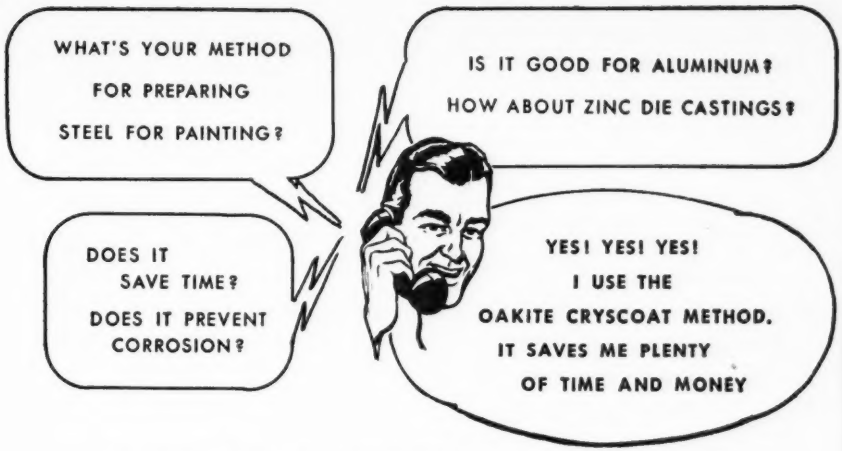
* The Ronal Bright Copper Process, using Lea Copper-Glo®, is a development of Ronal Chemicals, Brooklyn, N. Y.

Burring, Buffing and Polishing . . . Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions

®

THE LEA MANUFACTURING CO.
16 Cherry Avenue, Waterbury 20, Conn.

LEA MFG. COMPANY OF CANADA, LTD.
370 Victoria Street, Toronto 2, Canada


WHAT'S YOUR METHOD FOR PREPARING STEEL FOR PAINTING?
IS IT GOOD FOR ALUMINUM?
HOW ABOUT ZINC DIE CASTINGS?
DOES IT SAVE TIME?
DOES IT PREVENT CORROSION?
YES! YES! YES!
I USE THE OAKITE CRYSCOAT METHOD.
IT SAVES ME PLENTY OF TIME AND MONEY

The OAKITE CrysCoat* PROCESS does three things at one time:

1 Cleans metal rapidly—removing cutting, drawing, stamping oils and compounds, rust preventives, fluxes, smuts and other soils.

2 Conditions metal for painting—preparing steel, aluminum, zinc die castings and other metals for lasting adhesion of paints, lacquers and enamels.

3 Increases resistance to corrosion—preventing it before painting; localizing it after painting.

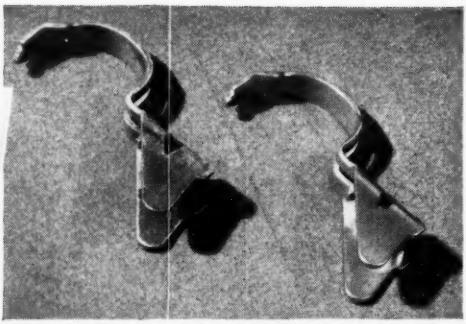
Eliminating the need for separate cleaning and phosphating operations, the OAKITE CrysCoat PROCESS cuts costs these ways:

- **Uses less equipment**
- **Cuts operating time**
- **Reduces heating costs**
- **Saves cost of acid-proof equipment**
- **Reduces scaling and sludging**
- **Saves paint**
- **Reduces rejects**

FREE Write to Oakite Products, Inc., 20 Rector St., New York 6, N. Y., for a copy of *"The OAKITE CrysCoat PROCESS"* describing 19 advantages. *Reg. U.S. Pat. Off.

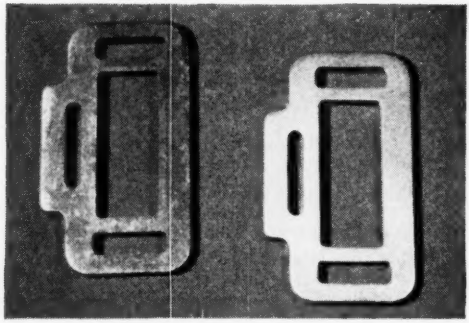
Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE



REMOVING HEAT-TREAT SCALE and deburring the hard-to-get-at areas on these steel trigger guards with ALUNDUM Tumbling Abrasive helped speed up the finishing of these defense items.

You can BARREL-FINISH *to* BLUEPRINT ACCURACY *with Norton* ALUNDUM* *Tumbling Abrasive*



DEBURRING these parachute buckles — particularly the inner surfaces—is a good example of how barrel-finishing with ALUNDUM Tumbling Abrasive can solve a tough finishing job.

You get real *precision finishing* with Norton ALUNDUM Tumbling Abrasive. Being all aluminum oxide — not a bonded material — its cutting action is continuous, without glazing. It has the hardness required for fast, positive cutting and the hardness and toughness for long, productive service life.

SEE YOUR NORTON DISTRIBUTOR

For every barrel-finishing application, on ferrous or non-ferrous metals, for any type of barrel, there's a grit size of ALUNDUM Tumbling Abrasive that will give you exactly the results you want. Your Norton Distributor can supply you promptly — and he'll gladly call in a Norton Abrasive Engineer to study your finishing operations and make specific recommendations.

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Distributors In All Principal Cities
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Norton Behr-Manning Overseas Inc.
Worcester 6, Mass.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

Free Handbook
55 illustrated pages describing every detail of barrel-finishing. Ask your Norton Distributor or write us direct for your copy of Form 501.

NORTON
ABRASIVES
Making better products to make other products better

Evenly distributed ventilation, too. That means air-cooled operation even under severest use—more pressure without burning—faster cut—more composition mileage—and longer life for the buff. Air rushes into those extra large holes at the center, circulates right through the wheel, and escapes at the face. This constant flow of air—plus the fanning effect of the ruffles at the face—*eliminates excessive heat.*

Now take a look at the rest of these features: There's an extra safety factor in the rugged steel ring that anchors the cloth at the center; every buff is perfectly balanced; and that exclusive H-VW-M Red-E-To-Use Face is all set to take composition without raking or truing. Ruff-L-Buffs are available in a wide variety of types and weights for any application—to do a *better* buffing job for *you.*

Top quality buffs are just one of many results of over eighty years of constant electroplating and polishing development—a continuing policy summed up in H-VW-M Platemanship . . . your working guarantee of the best that industry has to offer—not only in buffs—but in every phase of plating and polishing. ®

PLATEMANSHIP

For full information on Ruff-L-Buffs as well as all H-VW-M buffs ask for Bulletin B-100.

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

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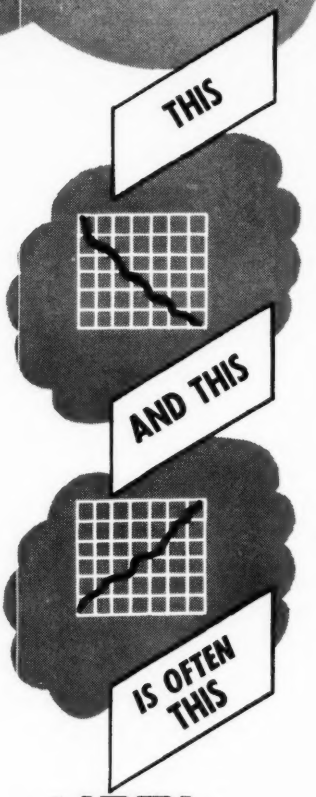
THE DIFFERENCE BETWEEN



MORE and more, manufacturers recognize the important part product finish plays in determining the rise or fall of the graph lines on their charts. It is no coincidence that they seek the advice of the most expert finishing counsel available.

Whether your finishing problem is to develop a coating to add life and durability to your product . . . one to perk up sales appeal . . . a system to cut production costs, or a formula to meet exacting defense work specifications . . . it will pay you well to call in an Egyptian Industrial Finishes Specialist.

You will find him a thoroughly trained sales and production minded technician. His finishing "Know How" can help you push that graph line to the top of the chart and keep it there.

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EZRA A. BLOUNT, *Editor*
(On leave of absence
U. S. Air Force)

PRODUCTS finishing

AUGUST 1952
VOLUME 16 • NUMBER 11

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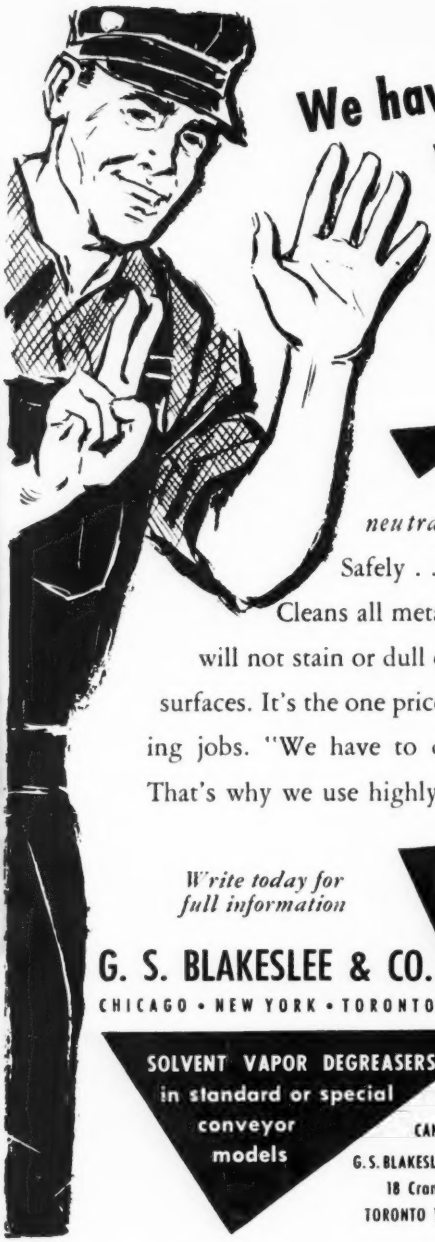

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Lee-Rowan switches to 3M Belts for higher polish on metal hangers

PRODUCTION PROBLEM: Reduce finishing costs . . . produce a higher polish on product. Manufacturer was using costly, troublesome set-up wheels. Finish was unsatisfactory.

3M RECOMMENDATION: Switch to 3M Abrasive Belts and a swift 3-step operation: one pass on a No. 180 Belt, one pass on a No. 240 Belt and a final pass on a greased No. 240 Belt using a Buff Contact Wheel.

THE RESULTS: This speeded-up finishing method is currently producing a highly polished hanger—with greatly reduced abrasive costs. Process is easier and safer for operator.

Let a 3M Methods Engineer analyze your abrasive requirements and recommend how you can cut costs, step up production through the use of 3M abrasives.

Minnesota Mining & Mfg. Co.
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Please send me free booklet
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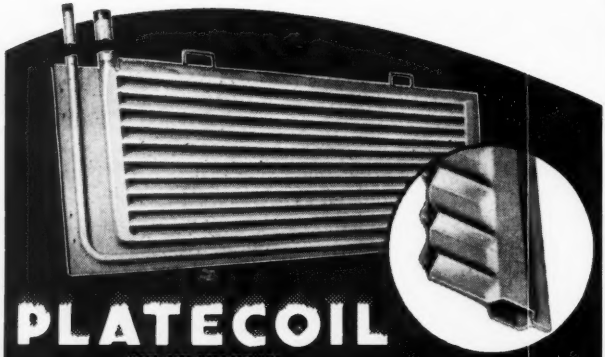

PLATECOIL

(REPLACE PIPE COILS)

cost less than fabricating pipe coils in your own plant

You can buy Platecoils for less money than it costs to fabricate pipe coils in your own plant. You also save critical steel because Platecoils require less than ½ the steel used in pipe coils of the same surface area. Installation takes far less time as Platecoils are mounted on simple hangers instead of the complicated racks needed for pipe coils. They take 50% less space.

Send for complete technical manual and descriptive Bulletin No. P50.

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

Why Platecoils Cost Less

LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction

EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

LITERATURE

The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

Kold-Hold Manufacturing Company, Lansing 4, Michigan

SUCCESSFUL SOLVER OF METAL CLEANING PROBLEMS FOR

Alcoa
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and many other
major metal processors.

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At your service if you are located in his territory.

Jim Hester ideally personifies the unusual competence of Ransohoff field engineers. His proved skill in whipping tough metal cleaning problems is backed by the great accomplishments and service of the extensive Ransohoff field and headquarters staffs which combine over 175 years of experience in the engineering and manufacturing of efficient metal cleaning and surface treatment equipment.

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EQUIPMENT FOR THE SURFACE TREATMENT OF METAL

5813 Vine Street **Cincinnati 16, Ohio**

AMERICAN CHEMICAL PAINT COMPANY
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: PROTECTING ALUMINUM WITH ALODINE®

ALODIZING IS EASY AND EFFECTIVE

The Alodizing process is a chemical one and does not require electrolytic techniques or equipment. Alodizing is simple, foolproof, low in cost, and requires a minimum of equipment. Essentially, the process consists of the following easily controlled operations or steps:

1. Cleaning the work
2. Rinsing the cleaned aluminum surfaces
3. Coating with "Alodine"
4. Rinsing with clean water
5. Rinsing with acidulated water
6. Drying

After treatments. Alodized aluminum provides an ideal bonding surface for paint, wax, adhesive, or other organic finishes. These should be applied in accordance with the manufacturer's directions. Unpainted or exposed areas will be protected by the tough, durable "Alodine" surface.

Flight of the Chance Vought Cutlass, seventh in a line of outstanding fighters and "potentially capable" of flying faster than any other service type jet aircraft in production, land or carrier-based. Substantial surface areas of the Cutlass are constructed of painted Alodized aluminum.

FAST COATING TIME

With the "Alodine" bath at its normal temperature of 120°F., coating time by immersion approximates 1½ minutes and by spraying, 15 to 20 seconds. Coating times and bath temperatures can be varied to suit operating conditions.

"ALODINE" HAS UNLIMITED APPLICATIONS

Parts can be treated by immersion, by spraying in an industrial washing machine, by flow coating, or by brushing. This means that "Alodine" can be used anywhere, on any part or product made of aluminum. This has led to widespread use of the Alodizing process: 1. by fabricators of aluminum products in all industries to assure the utmost in product protection and finish durability; 2. by manufacturers of aluminum who are supplying Alodized aluminum sheets and coils from the mills.

In general, small size products or parts are processed rapidly and conveniently in immersion equipment, which can be mechanized if production volume justifies it. For large production of formed parts, or for Alodizing coiled stock, strip, or cut-to-size sheets, a five-stage power spray washer is most convenient. Airplanes, trucks, trailers, housing, railway cars, bridges and other large units are Alodized in a simple brush-on or flow-coat process.

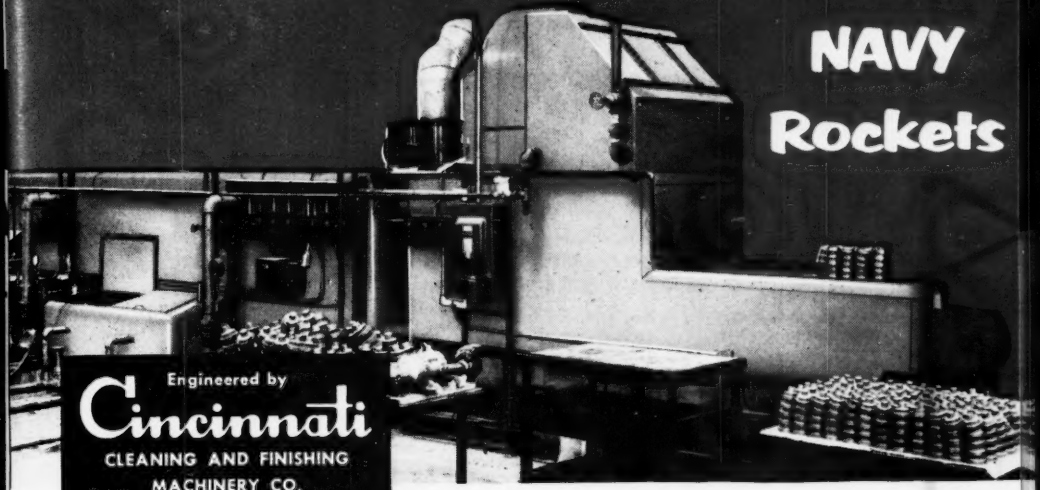
"Alodine" applied by immersion or spray complies with the rigid performance requirements of MIL-C-5541; MIL-S-5002; 16E4 (SHIPS); U.S. Navord O.S. 675.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "ALODINE" AND YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

Complete Finishing System for NAVY Rockets



Engineered by

Cincinnati

CLEANING AND FINISHING MACHINERY CO.

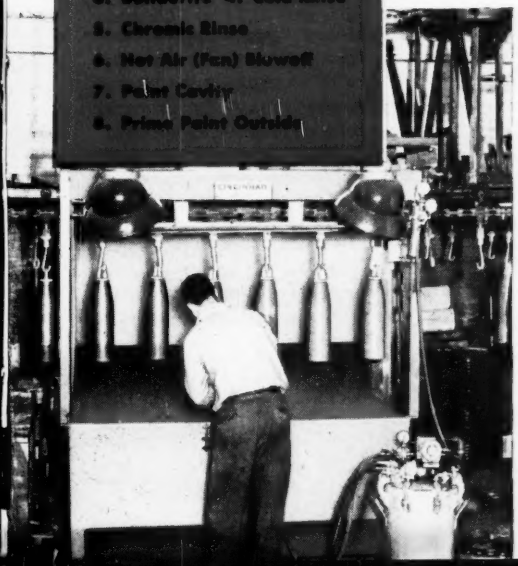
at the U. S. Naval Industrial Reserve Ordnance Plant operated by United States Hoffman Machinery Corp., Poughkeepsie, N. Y.

Cleaning and Bonderizing Machine

EIGHT OPERATIONS:

1. Wash
2. Rinse
3. Bonderite
4. Cold Rinse
5. Chromic Rinse
6. Hot Air (Fan) Blowoff
7. Paint Cavity
8. Prime Paint Outside

Spray Booth; painting Rocket exterior



CINCINNATI engineered, this complete finishing system for Navy Rockets includes a two booth paint finishing system, a Bonderizing machine and belt and monorail conveyors.

In order to successfully clean these hollow units, CINCINNATI Engineers provided an inclined conveyor belt through the washing and Bonderizing machine. This assures complete cleaning, draining and drying of the parts. A separate spray booth with a time-saving inside spraying mechanism was also installed.

With a minimum of adaption this CINCINNATI installation could handle a great variety of parts. Other representative installations have shown savings of up to 75% in time and cost.

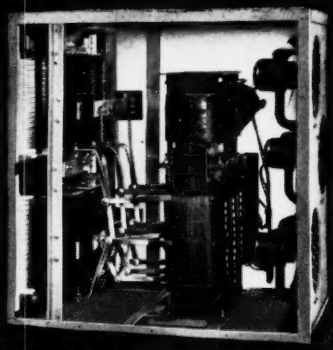
Write for your copy of the latest CINCINNATI Catalog today.

Cincinnati

CLEANING & FINISHING MACHINERY CO., INC.

311 HECLA STREET IRONTON, OHIO

ELECTRO-PLATING REQUIREMENTS *from* ANODES

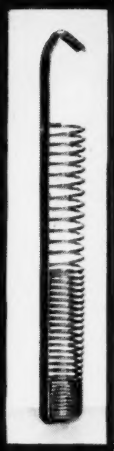


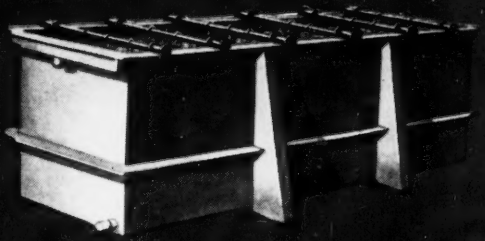
WAGNER-TIEDEMAN RECTIFIER with back panels removed showing easy access and simplicity. Note three low velocity cooling fans.

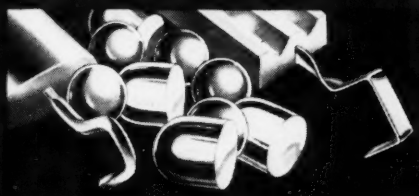
Anode production facilities here at Wagner Brothers are designed to maintain our reputation for providing none but *premium* products, the highest degree of purity in the plating industry. All types are available, promptly, in the following metals:

● Nickel, Iso-Cast Oval form, cast to give optimum grain size, any length. ● Copper, the famous Flat-Top, smooth surfaced, free from silicon, dirt and oxides; Lectrocop, pure electrolytically deposited slab form, any width or length, the lowest cost form of anode; Iso-Cast Oval, electrolytic copper molded under controls eliminating ferrous contamination. ● Zinc, in the *new standard* form, Flat-Top, easily identified, clean, cast from the purest metal. ● Tin, cadmium, available

Wagner







ANODE CONTAINER with spline welded full length, has 4-point contact. Plate at bottom catches "nubs", permits free circulation of solution. Close spacing of coils avoids jamming of anodes. Special lengths and curved containers fabricated promptly. Standard sizes in stock.

DOUBLE WELDED TANKS, all sizes, all types of linings, to your design or ours. Agitators, single or double cathode bars, as required.

WAGNER ANODES in all metals are recognized as standards of the industry. Every Wagner Anode is a premium product.

to ZINC SOLUTIONS

in any length in the distinctive corrugated Iso-Cast form with locked in steel contact hook. Balls are also available. ● White brass, 80% zinc, 20% copper, available in several shapes, as required.

Wagner-Tiedeman Electroplating Rectifiers have earned a place along with other Wagner premium products. Our ratings are conservative for full efficiency and safe performance. Removable panels permit quick and easy access. Ranges are from 2 to 50 volt, 750 to 10,000 or more amperes.

Wagner tanks are being incorporated in outstanding automatic and still tank operations everywhere. We're shipping to users far from our plant and the reason is simple: our tanks are built to last, our price is fair and we are ready to handle any quantity, one or one hundred, equipped with agitators and rods as required—or we'll provide your complete plating set-up, automatic or still tank.

Along with these products and the solutions, supplies and equipment for a complete electroplating system, we offer a competent sales-and-service staff. The Wagner representatives and branch managers are men with production experience and years of electroplating engineering behind them. They are backed up by an efficient laboratory and pilot plant, manned by some of the best technicians in the industry. Most important of all, you'll find every Wagner man enthusiastic about providing service to his clients and anxious to prove his ability and the integrity of the company he represents. Want proof? Pick up the phone and tell us your troubles or drop us a line at your first opportunity.

BROTHERS, INC. • 432 MIDLAND AVE., DETROIT 3

CHICAGO • CINCINNATI • ROCHESTER

New and Improved COMPOUNDS For *Every* CLEANING REQUIREMENT

NEW SOAK CLEANER

Metex T-103 alkali soak cleaner containing completely new type of oil emulsifier. An 8 oz./gal. solution operated at 180 to 200°F. will emulsify large amounts of oil and continue to displace oil from metal surface. Good hard water tolerance, easier rinsing, does not contain soaps, excellent for removal of stubborn stamping compounds and paraffin oils either as a soak or tumble cleaner for ferrous metals only.

METEX "SR"

Alkali reverse current cleaner for removal of smuts as well as removing phosphate coatings used in previous drawing operations. Entirely new formulation. Can be easily substituted for your present alkali cleaner in same equipment and operated under normal conditions of 8 to 12 oz. per gallon at 180-200°F.

PHOSPHOTEX

A new MacDermid zinc phosphating solution for all ferrous metals. High operating efficiency with considerable latitude of operating conditions. Steel equipment used throughout. Dense thick fine grained deposits obtained in a minimum of time.

MAC DERMID
Incorporated
WATERBURY 20, CONNECTICUT

30 Years Service
to The Metal Finishing Industry

You don't need a wet nurse . . . *with Monel*

You don't have to coddle your pickling equipment when it's made of Monel®. With normal maintenance procedures, tough, corrosion-resisting Monel will give you many years of service. Even after years of extended use it can be reconditioned for additional service.

And reconditioning is a snap! That's because Monel is highly workable and can be easily welded.

It's on extended delivery right now because of defense. So order well in advance and be sure to give your fabricator your NPA rating and complete end-use information as required by the NPA.

For an informative booklet, write today for your free copy of "A Good Start To A Better Finish."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

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extra life
extra capacity
extra safety

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A non-etching type aluminum cleaner for use in soak tank cleaning. It was specifically designed to remove drawing, stamping, spinning compounds, rolling oils, marking inks, crayon marks and shop dirt from common aluminum alloys prior to spot welding, anodizing or other finishing operations.

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COWLES CHEMICAL COMPANY
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editorial

Vol. 16, No. 11

AUGUST, 1952

Put "Performance Plus" Into Your Production Painting

No matter what the scope of your production painting operations and facilities, you have one principal objective. That is "performance plus"—application of a protective and/or decorative coating of unvarying, uniform quality at consistently low cost.

How can this vital two-fold goal best be realized?

Utilization of the most modern equipment in conjunction with the latest application techniques offers the brightest hope, of course. But what if you can't get or haven't got such equipment?

Your best bet, then, is to make the most of what you do have. As a starter, check with your materials suppliers to make certain that you are getting "maximum mileage" from your finishing materials. Often technical service representatives of such companies can give you many time-tested tips and production-proved pointers that you may be inadvertently overlooking.

Another way to put performance plus into production painting is to give your equipment—for example, air compressors, spray guns and booths, degreasers, washing machines, conveyors—the best maintenance care you possibly can. Doing this not only assures peak operating performance, but also contributes to longer life of equipment in productive service. And such attention will be reflected in quality standards as well.

A third avenue to greater efficiency in your search for savings lies in keeping abreast of industry's developments and trends, particularly as they affect your operations.

Today, as always, a good first impression invariably makes a lasting impression. It's the finish that counts—and that's what makes performance plus painting count. More paint power to you!

Arthur P. Schulze

High Operating Efficiency in Job Lot Finishing Of Small Parts

By FRANK L. BONEM
Associate Editor

PF FEATURE

The modern plant of Shakeproof, Inc., Division of the Illinois Tool Works, produces preassembled steel screws and nuts, stamped gears, lock-washers, different types of metal screws, and other fastening devices. These small parts are manufactured in production quantities and finished by plating or with conversion coatings according to customer specifications or the company's own standards. To handle the large volume of work, four automatic machines and numerous still tanks are utilized in the finishing department.

All major operations in this plant may be divided into three categories: forming, heat treating, and finishing. Since the diversity of products calls for different operations, all similar processes are grouped together, with the finishing department located between the manufacturing and heat treating bays. An ingenious and highly efficient roller and power-belt conveyor system ties all departments together, the small parts traveling on this system in tote pans of 100-pound capacity.

Washing precedes all operations following actual manufacturing and follows every subsequent operation. For example, the processes may be: manufacture, wash, harden, oil quench, wash, temper, zinc plate, and bake. Thus, all parts travel through the washing machine, illustrated in Fig. 1, at least once and often two or three times.

The washing machine is a Stevens Model C Automatic capable of cleaning 200 pounds of small parts per minute. The machine operates on a 9½ minute cycle and has ten barrels, each holding parts weighing up to 100 pounds, or the content of one tote pan. The process cycle is as follows, with loading and unloading completely automatic.

1. Load in the perforated, rotating barrels.
2. Wash in a solution of 6-8 oz./gal. of alkaline cleaner held at 200 deg. F.
3. Rinse in water held at 180-200 deg. F. This tank has a controlled overflow.
4. Dry by blowing hot air through

barrels.

5. Unload.

The air is heated to 250 deg. F. by a steam heater mounted on top of the machine. A vapor duct runs the length of the machine to collect all vapors which are exhausted to the atmosphere through the roof.

Automatic Plating and Phosphatizing

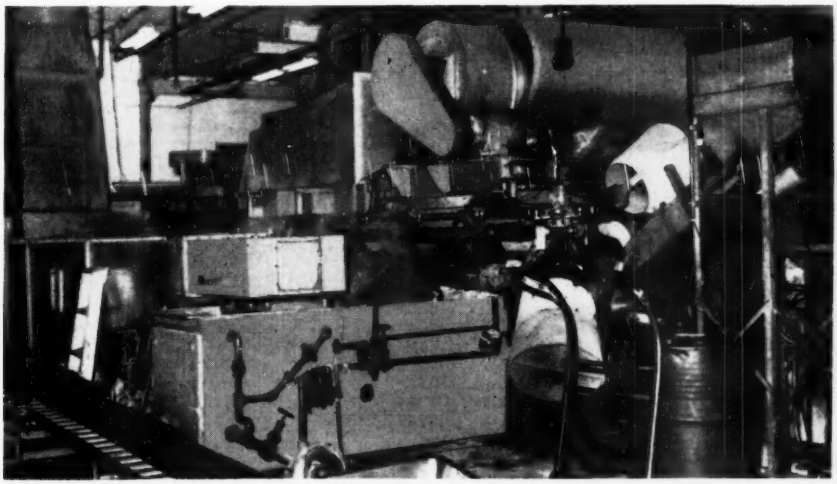
Three Model "C" Stevens Automatic Machines, installed side by side, are utilized for zinc and cadmium plating and phosphatizing (see Fig. 2). Each of the machines is ringed by a vapor duct which draws off all fumes through individual exhaust stacks. Other auxiliary equipment on each machine includes an automatic loading and unloading installation, a roller conveyor, and a control panel. One operator on each machine controls the complete process.

Loading is simplified through the use of an automatic weighing system which is made up of an elevated hopper, a Syntron vibratory feeder and an automatic under-and-over scale (see Fig. 3). The operator places the loading pan under the hopper, weighs out a charge, and empties the pan into the barrel.

Automatic unloading, as may be seen in Fig. 4, is achieved through the use of a hopper, through which parts fall as the plating barrels rise on the unloading cam. The hopper funnels the parts into tote pans which in turn rest on the roller conveyor. A gate at the bottom of the hopper prevents the parts from falling through when no pan is in the receiving position. Pans with finished parts are moved on the conveyor from the machine to the bake oven or shipping department.

The plating and phosphatizing machines consist of perforated barrels which ride on an inclined camway and are moved by a horizontal conveyor chain. These barrels are covered with a hard rubberized coating. Travel distance of the barrels from tank to tank is 30 inches. Time for indexing is 25 seconds and for dwell periods 1½ to 2

Fig. 1—A Model C Stevens full automatic adapted to an alkaline cleaning cycle. The automatic loading (also automatic unloading) installation is at the right. All manufactured parts pass through this machine at least once.



minutes depending upon thickness of the plate which ranges from 0.0001-0.0003 inch.

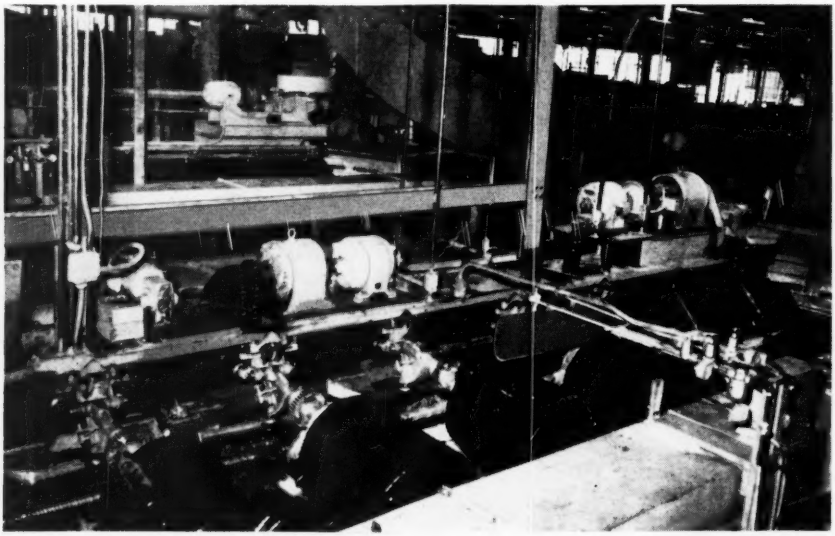
Process cycle for zinc plating consists of the following steps:

1. Load.
2. Dip in a cleaning solution maintained at a temperature of 100-120 deg. F.
3. Same as Step 2.
4. Cold water rinse.
5. Reverse current electroclean at 180-200 deg. F. using a cleaner concentration of 10 oz./gal. at a voltage of 18 volts.
6. Cold water rinse.
7. Plate in bright cyanide zinc bath using Du Pont's RH 309 Brightener. Minimum addition of this material per work day is 1,000 ml.
8. Cold water rinse.
9. Bright dip.
10. Cold water rinse.
11. Rinse in 200 deg. F. water.
12. Dry by hot air blast kept at 215 deg. F.
13. Unload.

For cadmium plating the cycle is similar to the one just described with the exception, of course, of the plating solution and the bright dip. The thirteen stations are:

1. Load.
2. Dip in a cleaning solution at a temperature of 100-120 deg. F.
3. Same as Step 2.
4. Cold water rinse.
5. Reverse current electroclean at 180-200 deg. F. using a cleaner concentration of 10 oz./gal. at a voltage of 18 volts.
6. Cold water rinse.
7. Plate in bright cadmium plating bath containing Rohco 20X-L for brightening.
8. Cold water rinse.
9. Bright dip.
10. Cold water rinse.
11. Rinse in 200 deg. F. water.

Fig. 2—The two automatics used for plating cadmium (front) and zinc (rear). Completely surrounding fume ducts prevent vapors from escaping into the plant. The manufacturing area may be seen in the background.



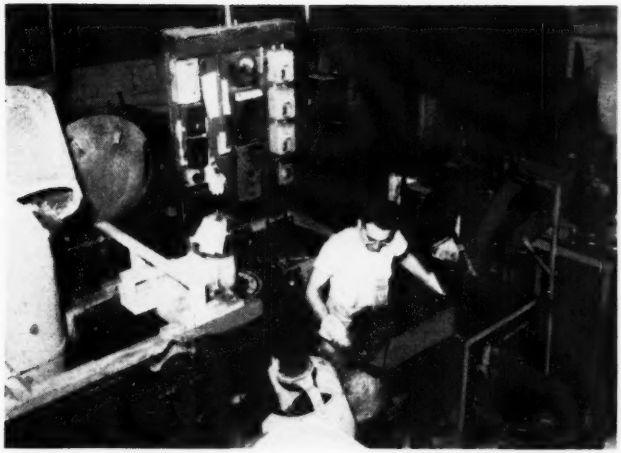


Fig. 3—A view of one end of the Parkerizing machine, showing an operator about to load an automatically weighed charge. Note how small sections of roller conveyors eliminate all lifting of the pans by the operator.

12. Dry by hot air blast kept at 215 deg. F.
13. Unload.

For phosphatizing, a ten-step cycle is employed, the different stages being as follows:

1. Load.
2. Cold water rinse.
3. Clean in an alkaline solution containing 6 oz./gal. of cleaner kept at 180-200 deg. F.
4. Cold water rinse.
5. Rinse in hot water. This rinse is kept hot for the specific purpose of preheating the parts.
6. Phosphatize in a solution of Parco Compound held in the range of 195-210 deg. F. To allow sufficient time to form the conversion coating, this station is extra long, being equivalent to twelve stations in a regular cycle.
7. Hot water rinse.
8. Rinse in Parcolene held at 180-200 deg. F. Because of the time cycle in the machine, a very low

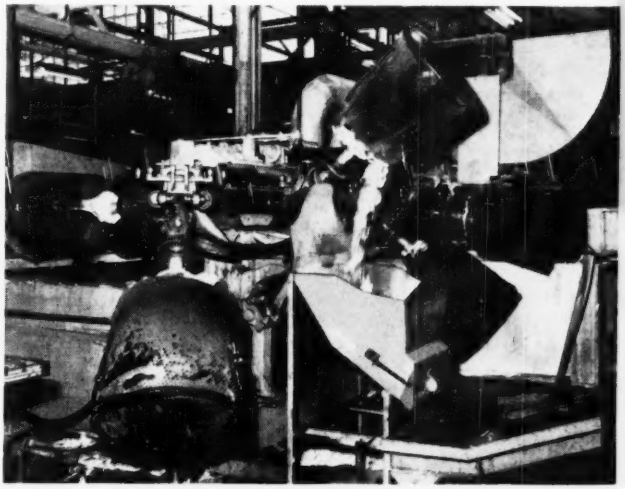


Fig. 4 — Unloading station of the zinc plating machine. Parts fall from the barrel through a hopper into a tote pan resting on the roller conveyor. Pans are then pushed on this conveyor to the bake oven. Again, no manual lifting is required.

Fig. 5—The cleaning tanks through which small job lots pass in preparation for plating.

concentration of this solution is necessary.

9. Dry in hot air blast of 200 deg. F. Two stations are used for drying.
10. Unload.

Total time for Parkerizing ranges from 30 to 40 minutes. With loads of 40 pounds in each barrel, approximately 800 pounds can be processed in this machine each hour.

Conventional Barrel Plating

On orders of sizes that do not warrant the use of the automatics, or for heavier plating of parts, Shakeproof employs sixteen horizontal barrel plating tanks and necessary auxiliary processing tanks. Here, zinc, cadmium, copper, and nickel are plated in Hanson-Van Winkle-Munning barrels to a thickness usually in the range of 0.0005 inch.

In cleaning, parts are immersed into the solutions in perforated steel buckets, suspended from a hoist which travels on an overhead I-beam (see Fig. 5). A fume duct runs the total length of the cleaning tanks to keep the air vapor free. The cleaning cycle consists of the following six steps:

1. Dip in a cleaning solution held at 100 deg. F.
2. Rinse in cold water.
3. Clean in solution of 6 oz./gal. Cowles alkaline cleaner at a temperature of 180-200 deg. F.
4. Rinse in cold water.
5. Bright dip.
6. Cold water rinse.

The sixteen plating tanks are divided into groups of four, one group being used for copper, nickel, zinc, and cadmium respectively. Plating tanks are installed in batteries of two (see Fig. 6), and are serviced from bus bars carrying 12 volts. (Plating barrels are 14 inches in diameter and 30 inches long.) Here again, exhaust ducts run the length of these tanks, thus eliminating all vapors from Shakeproof's large one-floor plant.

Cadmium plating is accomplished in a conventional bath, the steps being as follows:

1. Clean as outlined previously.
2. Plate in bath made up of:
   Cadmium metal ____ 3.5 oz./gal.
   Total cyanide _____18 oz./gal.
   Sodium hydroxide __ 2 oz./gal.
   Temperature is approximately 90 deg. F. or room temperature.

3. Rinse in water used for solution make-up.
4. Rinse in running water.
5. Transfer parts to cylindrical baskets and bright dip.
6. Cold water rinse.
7. Rinse in hot water.
8. Dry.

Zinc plating is similar to cadmium plating and follows the cycle listed below:

1. Plate in cyanide bath containing: Zinc metal _____ 5.5 oz./gal. Total cyanide ____16-18 oz./gal. Sodium hydroxide __ 16 oz./gal. Operated at a temperature of about 100 deg. F. and current density of approximately 3 to 4 amp./sq. ft.
2. Rinse in solution concentration rinse.
3. Rinse in running water.
4. Transfer parts to cylindrical baskets for bright dipping.
5. Cold water rinse.
6. Rinse in hot water.
7. Dry.

The copper plating process is much like the zinc and cadmium plating processes just described. The plating bath contains the following materials:

copper metal, 5 oz./gal.;
free cyanide, 2.5 oz./gal.

The copper bath is operated at a pH of 12.5, a temperature of 100 deg. F., and current density of approximately 3 to 4 amp./sq. ft. Plating time varies from 20 minutes to two hours depending upon the thickness required. About 100 pounds of parts per hour can be plated in this setup. After plating, parts are rinsed, first in a concentration rinse, then in running water.

Adjacent to the automatic phosphatizing machine is a manually operated installation, which is used when orders are too small to justify the use of the automatic plating units. The process is the same as that used in the automatic with the exception that the hot rinse prior to phosphatizing is omitted. The installation consists of six 250 gallon solution tanks in which drums of 400-pound capacity are automatically rotated. Parts are dried by spinning after the final rinse.

Because so many of Shakeproof's products are spring tempered, all ferrous material, and practically everything that is plated, is baked to relieve any possible hydrogen embrittlement.

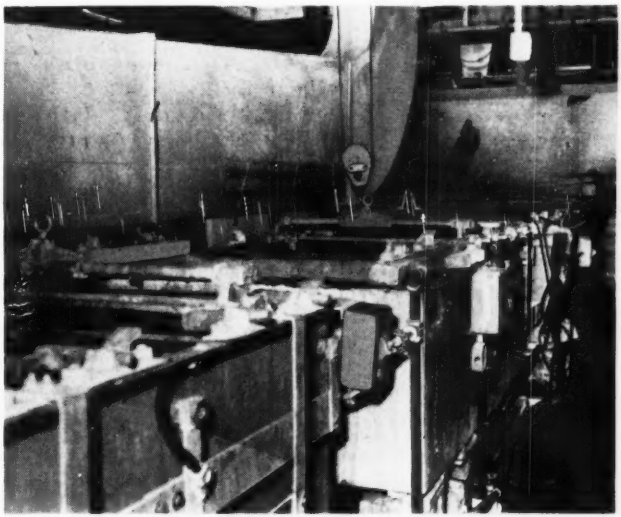


Fig. 6—A view of the barrel tanks used for plating cadmium. The fume duct (left) runs the length of the still tank installation. The cleaning installation may be seen in the background.

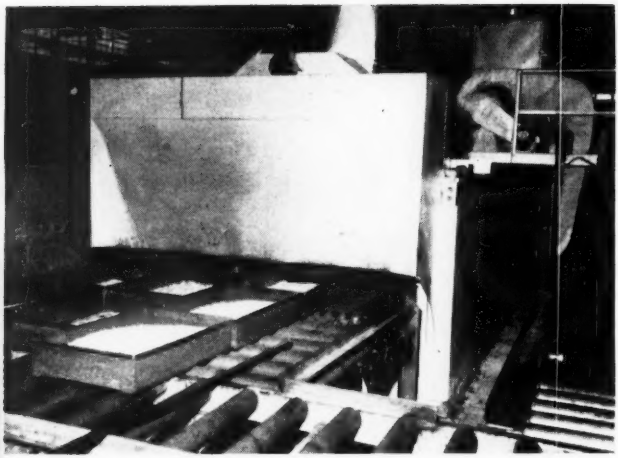


Fig. 7 — Entrance to bake oven in which all parts are baked to drive out hydrogen. Conveyors from all finishing operations converge at this point.

Shop pans are moved on the roller conveyor to the bake oven (see Fig. 7), which is 65 feet long. It is held at 400 deg. F. by recirculating air heated to the required temperature by five gas burners. Parts are baked for 3½ hours, three conveyors moving the pans slowly toward the exit shown in Fig. 8.

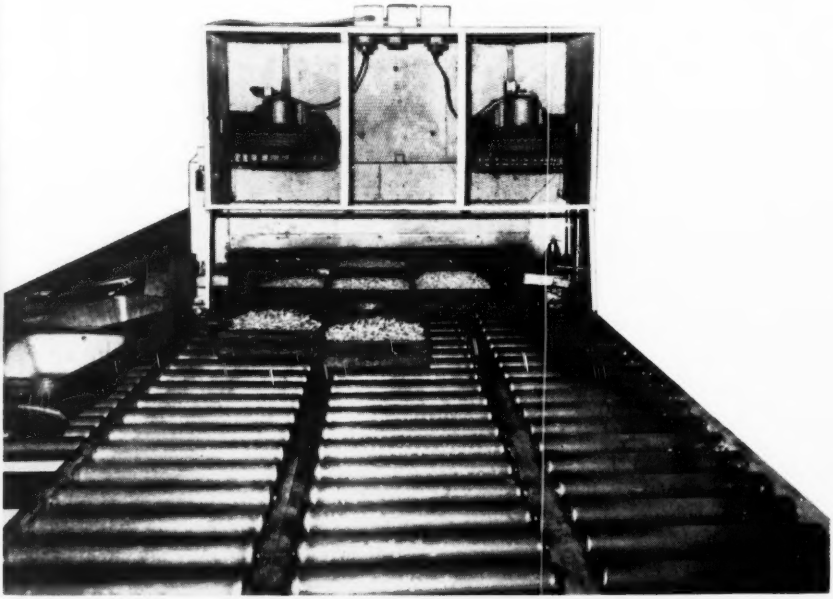


Fig. 8—Cadmium plated screws emerge from the bake oven after being exposed to 400 deg. F. air for 3½ hours. Note cooling fans for use if needed.

Miscellaneous Finishes

Enameling chromate conversion coatings, burnishing, and tinning are some of the other finishes which Shakeproof is able to offer. Due to the nature and usage of the pieces fabricated, these finishes are required in limited quantity and the equipment for their application is, by comparison with the other finishing installations, small.

For the various chromate conversion coating-finishes, a line of six 50-gallon tanks is used. Parts to be treated are dumped into small cylindrical baskets which are dipped into the tanks.

Tinning consists of dipping a pan of parts into a molten alloy consisting of 50 per cent lead and 50 per cent tin. This process consists of the following steps:

1. Flux.
2. Dip in lead-tin alloy.
3. Centrifuge to spin off all excess metal.
4. Dump into automatic separator. This machine separates those parts which may be sticking together and drops them into cooling water.
5. Rinse in water.
6. Spin dry.

One of the stamped nut products is usually finished with a synthetic enamel, mostly in olive green and black. The parts are painted in a Ronci Centrifugal Painter, after which they are loaded on large trays and baked at 250 deg. F. in a Koch Oven. Following baking, the nuts are dumped into a separator in which three tiers of whirling discs separate those nuts which are sticking together.

A very small fraction of the products produced are finished by burnishing. The barrel finishing installation is located adjacent to the enameling area and comprises three burnishing

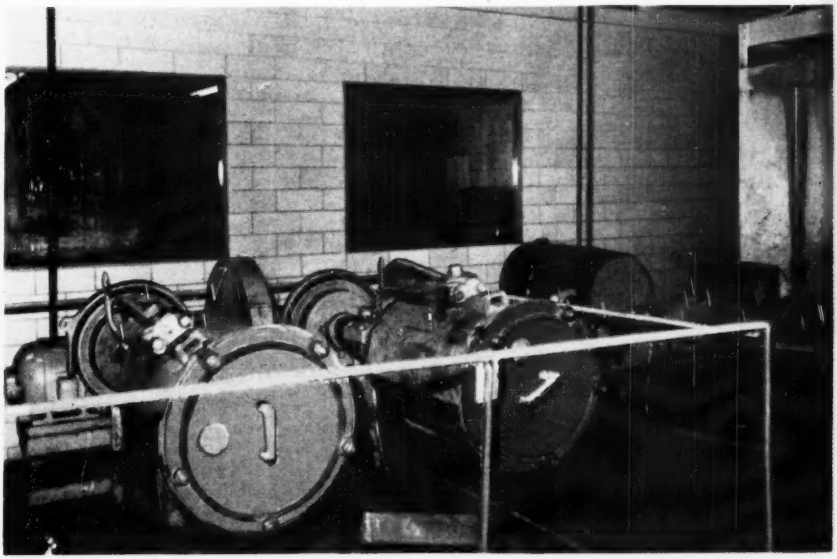


Fig. 9—View of the barrel burnishing area. The smaller barrel at the right is used solely for stainless steel parts. The control laboratory may be seen in the background.

barrels, as shown in Fig. 9. Small stones are used as part of the medium in the two larger barrels. The smaller barrel is lined with stainless steel and is used for burnishing and passivating stainless steel parts.

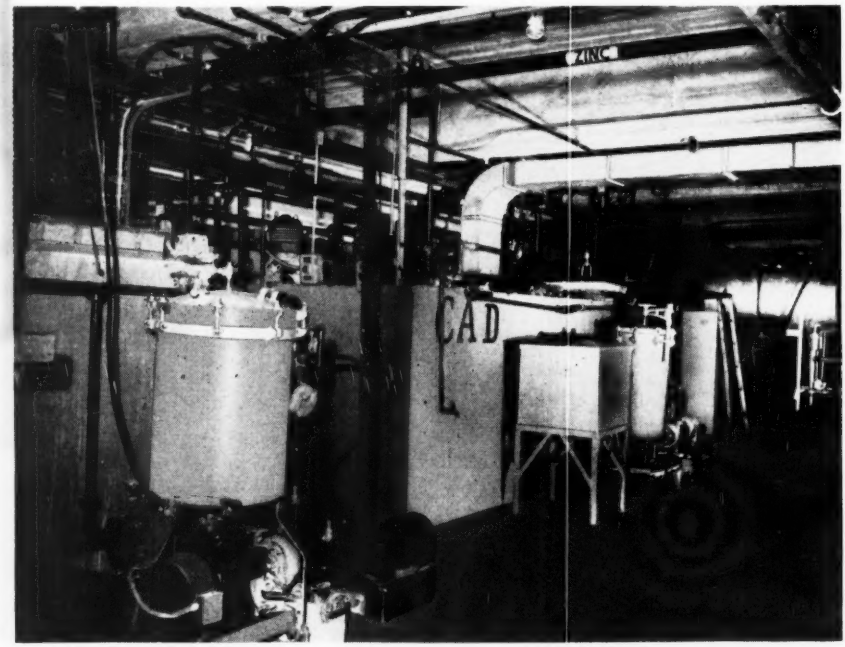
For stripping, two barrel tanks are located on the production floor. They contain solutions of ammonium nitrate for stripping cadmium and zinc, and sodium polysulfide for stripping copper.

Maintenance and Control

A large control laboratory is located next to the finishing department on the production floor, as shown in Fig. 9, rear. It contains a room for making chemical analysis, that is, solution control; a metallurgical laboratory for checking the heat treating processes; and a plating laboratory. The latter contains a small Lucite barrel plating tank and two small cylindrical oblique plating tanks for experimental and routine-check plating. An Industrial Filter and Pump Manufacturing Company salt spray cabinet, for testing salt spray resistance of the various finishes, completes the testing equipment.

In the basement of the plant, directly below the automatic plating and phosphatizing machines, are two 2,500-gallon plating solution circulating tanks (see Fig. 10). Both baths are continuously circulated by two 1½ h.p. Worthington stainless steel pumps. Rate of circulation at present is 30 g.p.m., although at the time of this writing, two pumps with a rate of 100 g.p.m. are

Fig. 10——A view of the recirculating tanks in the plant basement. From left to right, the zinc tank, cadmium tank, and phosphatizing tank. Note marked pipe lines.



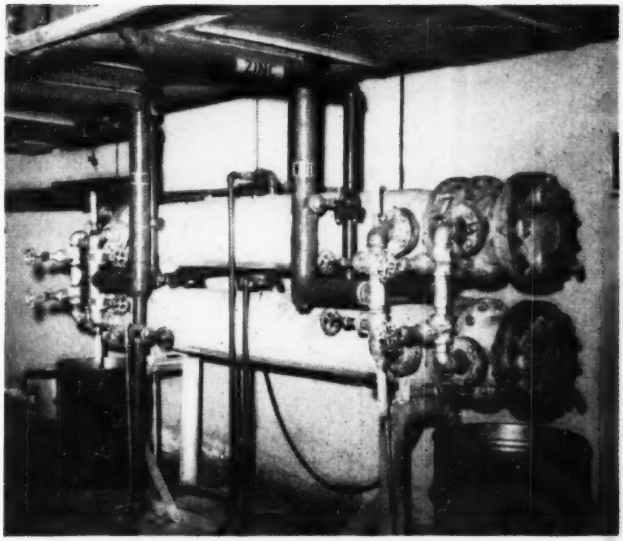


Fig. 11 — View of a heat exchanger in which plating solution is cooled by well water prior to being pumped back to a plating machine. (*All photos by PRODUCTS FINISHING*)

on order. Solutions are filtered prior to being pumped back to each plating machine by one Industrial and one Sparkler filter.

It is in these tanks that the daily additions of chemicals are made by means of baskets suspended from hoists riding on I-beams. Large air ducts withdraw all vapors arising from these tanks and all pipes are clearly color coded to identify their contents.

Due to heating of the plating solutions in barrel plating, solutions are cooled by passing through Bell and Gosset heat exchangers, shown in Fig. 11, prior to being returned to the plating machines. Each unit handles one plating solution, and both use well water for cooling.

A third 2,500-gallon tank is used as a reservoir for the Parkerizing solution to be used while the phosphatizing machine is being cleaned. All three of the tanks have automatic float controls which are connected to a warning system. Through the use of these controls any interruption in flow, such as may occur due to a leak, is immediately noted. The complete system is ideally suited for cleaning or any emergency maintenance work that may arise.

Further progressiveness of Shakeproof's management is illustrated by steps taken to prevent loss of reusable solutions and prevent stream contamination. At no time are spent plating baths dumped directly into the sewers.

From the copperplating tanks, copper solution is pumped through a refrigeration unit. The carbonates are frozen out of the solution and are scraped off the coils; the remainder is pumped back into the plating tank.

Cyanide solutions are treated to remove cyanide compounds and the remaining liquid is diluted before being dumped into the sewer system. Only the rinse water from the second rinse tanks carry dragout losses to the sewer. Water from the first rinse tanks is used for plating bath makeup. Close supervisory control is kept on all waste solutions by use of statistical control charts showing the chemical analysis.

Close control of waste, usage of both automatic plating machines and horizontal barrel tanks, and a highly mechanized product-flow system (see Fig. 12) have been combined to achieve bet-

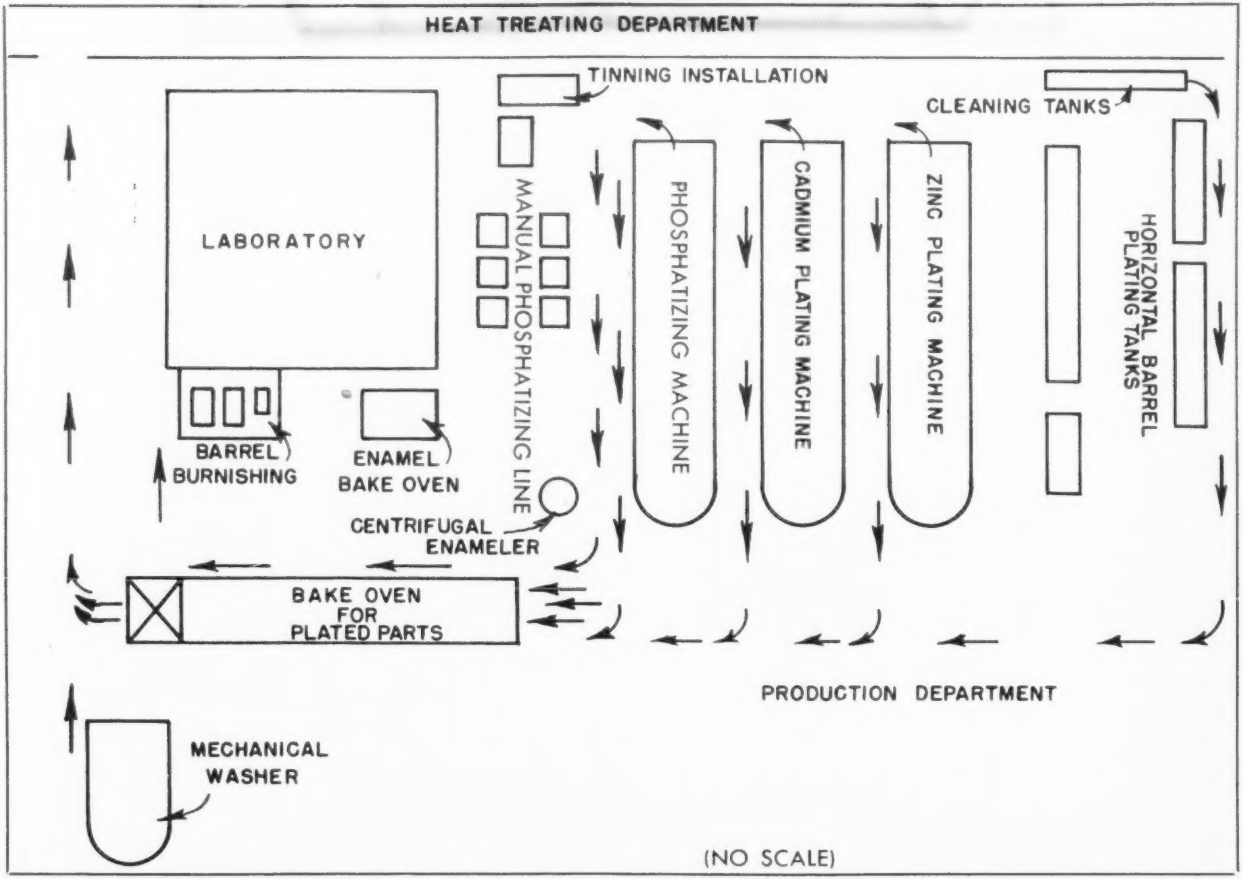
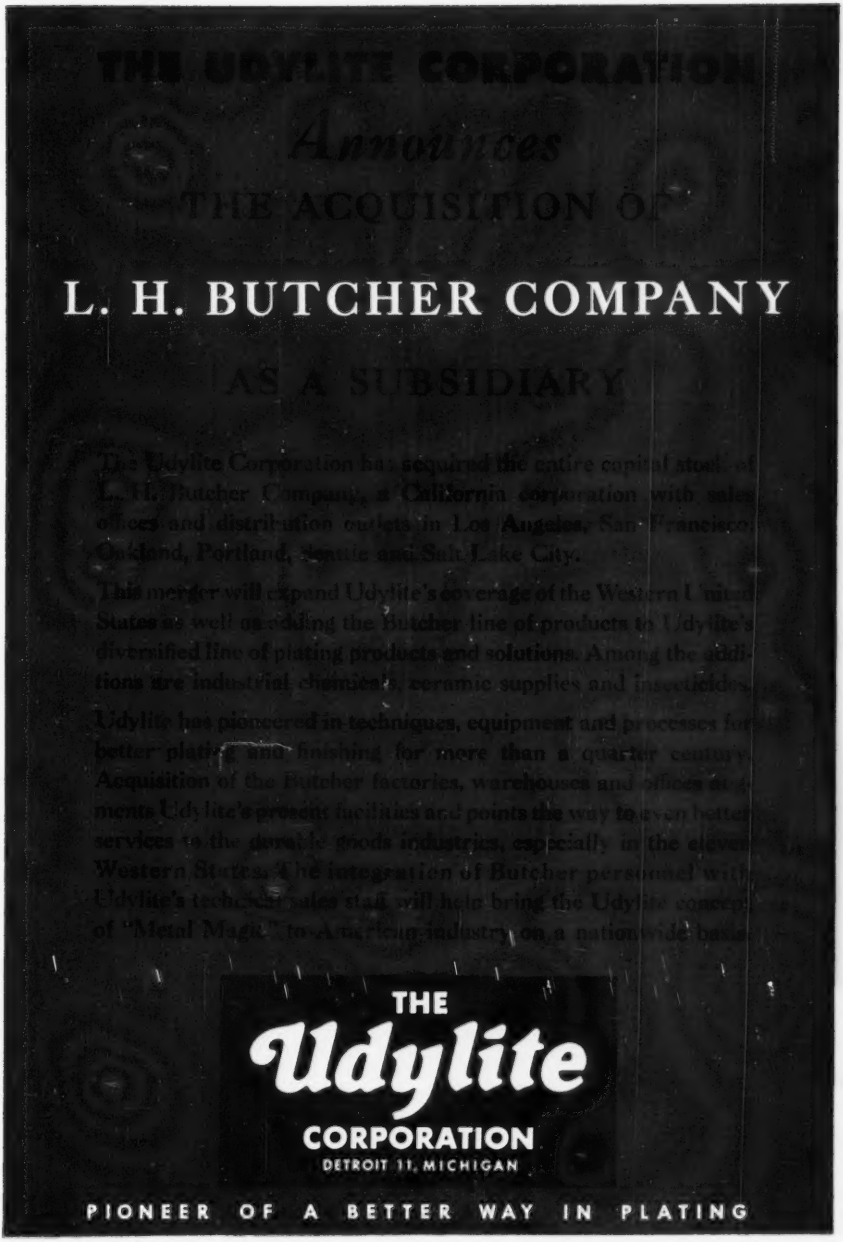


Fig. 12—A sketch showing the general layout of the Shakeproof finishing department. The arrows indicate direction of process flow through the department.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Mica Base Paint System Increases Transformer Tank Life

By J. G. FORD and A. J. KUTI

Manufacturing Engineers
Transformer Division
Westinghouse Electric Corporation
Sharon, Pennsylvania

THE life of the finish on Westinghouse distribution transformers has been more than doubled by a three-coat paint system which has been given the name, "Coastal Finish." This three-coat system (see Fig. 1) is applied in the same manner as standard finishes and is baked on for speed. A modification of this finish air dries; thus, it can be used to patch damaged surfaces of a transformer in the field.

Distribution transformers operate under especially severe conditions that affect the finish applied to the outside of the tank and associated hardware. The surfaces of fully loaded transformers exposed to direct sunlight often reach temperatures of 200 deg. F. or higher. During the winter months these surfaces may be exposed to temperatures as low as —50 deg. F. With an operating range of 250 deg. F., the paint must be sufficiently flexible so as not to flake off due to differential expansion and contraction between paint and metal.

Elevated temperatures and oxygen of the atmosphere also cause the paint films to age and become brittle. This accelerates the tendency to flake or craze during the winter months. It is important, therefore, not only to select a finishing material from the standpoint of initial flexibility but for heat resistance as well.

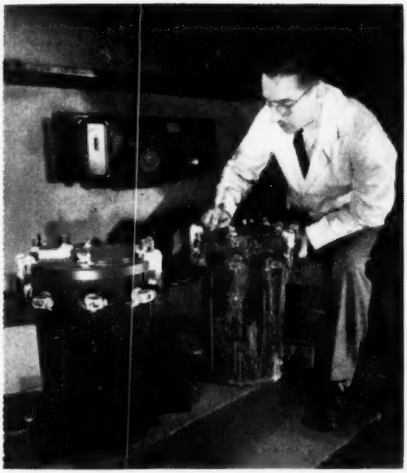

Fig. 1—The two transformer tanks were both exposed to 1000 hours of salt spray. The tank on the right had the standard three-coat finish while the one on the left had Coastal Finish.

Moisture in liquid or vapor form is perhaps the greatest enemy to the finish on distribution transformers. It readily attacks any exposed steel surfaces forming rust and gradually penetrates paint films corroding the metal underneath. Rust formation and hydrogen generated at the metal surface cause the paint to blister and lift. Once the film is broken, corrosion is accelerated and pits develop. If they are not given attention, they may eventually completely penetrate the tank wall. This may drain the insulating oil from the tank and cause the transformer to fail. If it were not for moisture, the finishing of pole-type transformers would present no serious problem except in rare cases. Oxygen, salts, acids, and alkalies present in seacoast and industrial atmospheres deteriorate the paint film and pave the way for moisture to

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And they are easy to apply! Just a simple chemical dip for only a few seconds produces the coating.

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combine to make Iridite the most economical chromate finish you can buy. Many Iridite chemicals are packed in powder form, thus can be shipped to you in steel pails at freight savings of up to 75%! Pails take less storage space, are easier to handle, eliminate carboys, need not be returned.

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do its damage. The effects of certain impurities accelerate corrosion by moisture once it gets to the metal.

The individual coats of the three-coat system act cooperatively to resist moisture penetration and also the elements that promote it. Proper preparation of the metal surface is necessary before the finish is applied. Good adhesion is generally obtained by removing all rust, scale, grease, or extraneous material. Ideal surfaces are obtained by treatment with phosphate solutions which form iron phosphate at the surface. The phosphate film retards corrosion and offers a tightly-adhering porous surface for the base coat of paint to penetrate and grip mechanically.

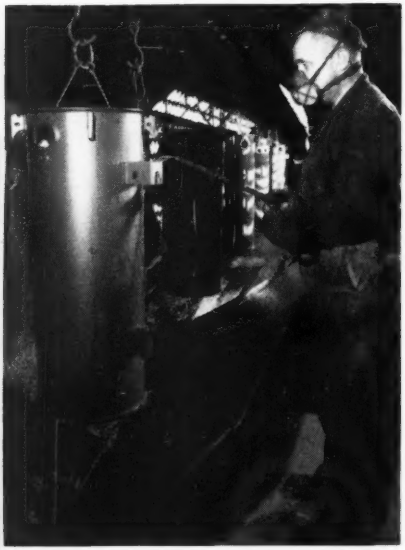


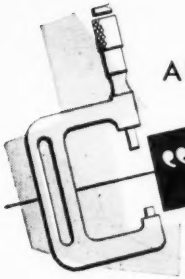
Fig. 2—The prime or first coat is applied by flow coating.

The prime or first coat applied to the prepared surface is composed of a vehicle giving good adhesion with desired flexibility and chemical resistance to salts, acids, and alkalies. The pigments used are primarily zinc chromate and iron oxide. Zinc chromate is perhaps one of the best corrosion-inhibiting pigments. However, if used as a single pigment, it usually produces a film that is somewhat brittle. When combined with iron oxide, the brittleness of the film is reduced and the vat or storage life of the paint is increased. Surprising as it may seem, when this combination is tested as a priming coat alone in comparison with other primers containing, for example, lead chromate or red lead, it may at times appear to be inferior. The superiority stands out when the tests are repeated after the finish coats have been applied.

The second or intermediate coat is without doubt the key to the successful performance of Coastal Finish. The vehicle is composed of modified phenolic and alkyd resins. These are chosen for resistance to heat, oxygen, salts, acids, and alkalies in concentrations generally encountered in the atmosphere. The resin is of the thermoset type. By proper selection of solvent and adjustment of setting time of the resin, it is possible to remove the solvent completely during the initial part of the drying cycle before the resin has set to the hard state. This permits the resin to flow after solvent elimination and prevents pinholes through which oxygen and moisture could enter.

The pigment is composed of selected mica flakes which overlap each other in the film and produce a "shingle roof" effect to further ward off moisture and oxygen. The mica also increases heat stability of the intermediate coat as much as ten times at elevated temperatures.

The use of mica in paint is not new but the way in which it is used in this paint has not been utilized in the past. The relatively large mica flakes plus their tendency to settle presented problems of application which have been overcome.



ANOTHER

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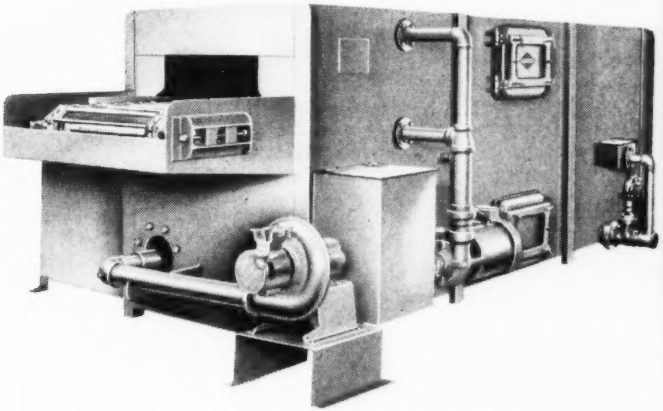
ALVEY-FERGUSON

WASHING MACHINE FOR INDUSTRY



WHEN a washing machine is needed to perform an unusual operation, it's almost certain that A-F Engineers will be called upon to build it! . . . The A-F Washing Machine shown here was built especially for removing sand from steel foundry flasks. A special feature is the Slo-Flo Tank (not shown in photograph) which settles the sand out of the cleaning solution before it reaches the screening tank for recirculation. Flasks are cleaned faster . . . and each flask is *uniformly* clean.

A-F

For a discussion of latest metal parts and products cleaning methods, write today!

THE ALVEY-FERGUSON COMPANY 626 Disney St. **Cincinnati 9, Ohio**

OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

The third and final coat is composed of resins and pigments to withstand the elements and to provide good appearance when new and after weathering has taken place. It can be tinted to produce any desired color. When chalking takes place, a slightly darker shade develops which does not detract from the appearance of the transformer.

The final coat has several functions:

1. It adds to appearance.
2. It enhances the resistance of the other two coats to oxygen, moisture, and so on.
3. It screens out the ultraviolet light of the sun's rays.

A series of panels was made to demonstrate the resistance of the combination of primer and mica-filled second coat to salt spray and weathering. These panels were phosphatized, given a coat of primer, and then two coats of the intermediate or second coat of the system. They were tested simultaneously with panels painted with the standard three-coat finish.

After 2,000 hours' exposure to the salt spray, the mica finish showed no change whereas the standard finish was approximately 50 per cent deteriorated. At 3,000 hours, the standard finish was completely gone. It required a total of 10,000 hours' continuous exposure to salt spray before small blisters began to appear on the mica finish. When the blisters were broken, there was evidence of trapped gas, possibly hydrogen, and a thin film of rust.

Fig. 3—Transformer tanks emerging from the oven are ready for the second coat.

Other mica-finished panels were exposed for 18 months on Florida and California seacoasts. Weathering took place at the surface exposing some of the mica flakes. However, there was no sign of corrosion. The exposed mica flakes appear to be largely parallel to the film surface and definitely indicate a shingled effect which may partly account for resistance to salt spray and added heat stability of the vehicle.

It appears also that the mica addition improves the coverage on sharp or burred edges, thus reducing the tendency to corrode at these points.

Applying The Finish

The metal surface is first alkali cleaned and rinsed, followed by phosphatizing and a dip in dilute chromic acid. This results in a clean, light gray surface of sufficient porosity for good paint penetration with maximum adhesion. To prevent any contamination of the prepared surface, the transformer tanks are given the first or priming coat within a matter of hours by flow coating, as shown in Fig. 2.

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Eliminate hazardous solvent cleaning and expensive chlorinated degreasing installations. Find out about KLEM'S new Rust-Sol—a concentrated phosphoric acid cleaner that gives metal a slight etch which provides an excellent paint bond. Rust-Sol imparts a neutral iron phosphate coating to the metal surface for long paint life. Rust-Sol is suitable for a wash off or wipe off type application or can be used in immersion and spray systems.

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Viscosity and gravity are controlled. The flow coating process is used for priming to fill any crevices left between tank wall and projection welded parts. It also assures complete and uniform coverage of all parts. The tank then is conveyed by monorail through an infra-red oven. A surface temperature of approximately 340 deg. F. is reached by the time the tank leaves the oven, as shown in Fig. 3.

After cooling, the second coat is sprayed on, as shown in Fig. 4. A dark green dye is incorporated into the otherwise clear mica-base enamel to assist the operator in determining coverage and to allow for easy and quick inspection. The dye fades out, leaving a dark brown color on subsequent infra-red baking, which is done in the same type oven and at the same temperature as for the first coat. The film dries to make a hard, tough, abrasion-resisting coating.

Not until the transformer is completely assembled and tested is the third and final dark gray coat applied. The transformer is then conveyed through a steam convection oven, operated at 160 deg. F., where the final coat is dried tack-free. Hardening of the film takes place in storage and shipment.

Fig. 4—The second, or mica-base coat, is applied by spraying.
(Photos courtesy Westinghouse Electric Corp., Pittsburgh, Pa.)

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Conservation of Sulfuric Acid and Nickel Sulphate in the Pickling Department

By M. H. WHITEHEAD
Canton Stamping & Enameling Company
Canton, Ohio

WHEN dealing with a subject of this nature consideration must be given to the wide variation of pickling procedures followed in the trade, the vast differences in physical plant available to the operators, the volumes of output involved, the kinds of steel

Here are some examples of the many different types and grades of Stevens Compositions:

Tripoli – Stevens manufactures six grades of Tripoli Compositions for hand buffing operations; and five grades for machine and high-speed hand operations.

Tampico – Tampico is available in three grades. All have a fast cutting action when used on Tampico or Sisal wheels for satin and brush effects and deburring.

Liquid – Stevens offers both Tripoli and Stainless liquid compositions. They have these advantages: Excellent cut and color, high flash point to reduce fire hazards, excellent buff wear, can be stored indefinitely, are sprayable at 10-40 lbs. pressure and are easily cleaned.

We gladly submit samples of these or any other Stevens Composition for testing in your plant. If possible, send us sample parts, finished and unfinished. Or send a description of parts and surface condition, buff diameter and speed, whether hand or automatic, and type of cleaning.

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  Stevens has every facility to insure uniformity of formula, texture and dimensions.
- **CONTINUOUS RESEARCH**
  Stevens technicians are constantly checking new materials for adaptation to customer requirements.
- **CUSTOMER SERVICE**
  Service men with practical experience solve customers' problems, in their plant or in our experimental laboratory.
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  Stevens has three manufacturing plants, six warehouses and a staff of service representatives, all located for prompt service.

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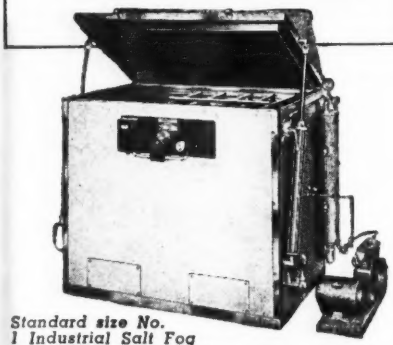

Standard size No. 1 Industrial Salt Fog Testing Cabinet. Larger sizes are engineered to suit requirements.

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Consider these features:

- Lucite nozzle with fixed orifice that does not corrode or clog.
- Rubber-lined box for protection against corrosion.
- Accurately controlled enclosed heating.
- Fully insulated for heat economy.
- Air by-pass valve to clear cabinet before inspection of specimen.
- Exhaust flange at rear.
- Air compressor with oil filter. (Cabinet can be connected to other air dryer.)
- Air-operated cover lifter (extra).

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processed, and the final surface conditions desired.

This discussion will touch briefly on the storage, handling, use and possible reclaiming methods to obtain maximum benefit of the available supply of sulfuric acid and nickel salts for the treatment of sheet steel prior to porcelain enameling.

When sulfuric acid is purchased in tank cars or tank trucks, it is well to establish a program of routine inspections of storage tank, transfer pipe, and all valves and fittings to ensure against loss of acid due to failure of these items. Installation of a safety shut-off in the discharge opening of the storage tank will permit a quick stoppage of flow in any emergency in the transfer system. Such a shut-off may consist of a tapered lead plug suspended immediately above the opening by means of a quick-release device through the top of the tank, so that a flip of the catch will drop the plug and seal the opening.

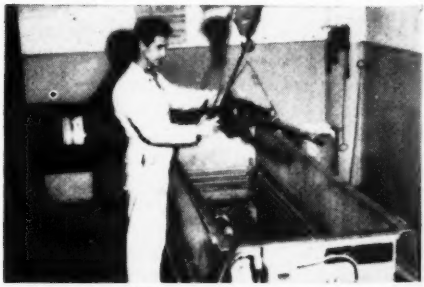
It is believed that ordinary black iron pipe is suitable for all the transfer pipe except the last length preceding the service discharge valve. This last length of pipe should be brass so that adequate flushing with water can be accomplished without damage to the pipe. (Dilute acid will attack the iron readily, whereas the concentrated product will not.)

A vessel of earthenware or iron should be placed under the service outlet to catch any spillage or drip when acid is being measured for addition to the pickling tanks. Any acid thus saved may be included in the regular addition at any time.

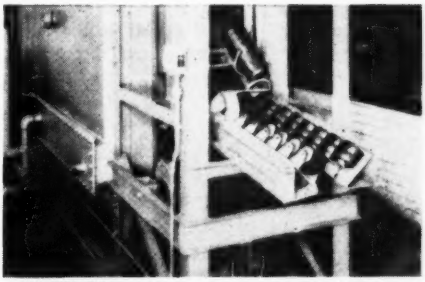
In the use of sulfuric acid pickling tanks the primary factors of conservation are involved with process and operational control. Aside from any problems or defects resulting therefrom, overpickling is wasteful of acid and should be avoided by establishing and maintaining r i g i d control of

VAPOR DEGREASING *with* "TRICLENE" D
(TRICHLORETHYLENE)

cleans ordnance equipment in less than a minute!



AIRCRAFT ORDNANCE is prepared for installation by the removal of grease-like storage preservatives in a manual degreaser. "Triclene" D vapors reach into deep recesses of intricate parts . . . quickly remove oil, grease and cutting compounds. One man can easily operate simple degreasing equipment.



ARTILLERY SHELLS emerge from conveyorized degreasing unit at assembly line speed. Fast, thorough cleaning action of "Triclene" D permits use of conveyor systems for high production rates. Equipment is low in initial cost . . . efficiently reuses solvent for maximum economy. (Navy Photo)

WHERE SPEED IS ESSENTIAL in metal cleaning, as in the ordnance field, vapor degreasing with "Triclene" D Trichlorethylene meets top production demands. The heaviest oils and grease are removed from sections of all sizes, shapes and metals in a matter of seconds! Even the most intricate parts are thoroughly cleaned at the same speed in the same easily operated equipment. In all types of vapor degreasing equipment, "Triclene" D gives peak performance . . . uniform results. It quickly cleans the most difficult parts and leaves them warm and dry—instantly ready for further processing.

"TRICLENE" D is designed for vapor degreasing by the pioneers of the synthetic solvent field. In wide use for many years, "Triclene" D is fully backed by Du Pont research plus the practical advice and assistance of Du Pont technical representatives. Here are "Triclene" D's outstanding properties:

- **Stable**
- **High purity**
- **Withstands moisture and heat**
- **Narrow boiling range**
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FOR MORE INFORMATION about vapor degreasing with "Triclene" D, send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

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strength, temperature and time of immersion. The effects of each of these factors on the rate of attack on the steel surface are well known, and need not be dealt with at this time. Overpickling is costly in that acid is expended, and iron sulfate is gradually built up to the point that pickling is retarded and the tank must be discarded.

Scumming of tanks results mainly from poor cleaning and/or poor rinsing, and may eventually cause the tank to be discarded if not properly dealt with. Careful attention to cleaning and rinsing is the first step to be considered, and careful removal of scums formed follows. Periodic dipping of scums during operation is helpful, and painstaking cleaning of the surface and sidewalls of cooled tanks during shutdowns will increase tank life. A blast of cold air across the tank prior to scum removal during shutdown will facilitate the collection of the scum in a limited area of the solution surface.

If acid is purchased in carboys most of the foregoing remarks are applicable, and all that need be said further is that suitable safe storage space and proper tilting devices be provided.

Of more concern than acid are the highly critical nickel salts. These strategic materials are not only in short supply, but very expensive as well. This is true in some branches of the industry to an even greater extent than in others.

In the final judgment of any process we are not interested solely in particular steps or phases, but in the end product. The end product, as far as the pickling department is concerned is a steel surface, properly prepared for porcelain enameling, developed by synthesis, if you will, through the various phases of preparation, each phase being affected by one or more of those preceding.

Storage of nickel salts, whether in

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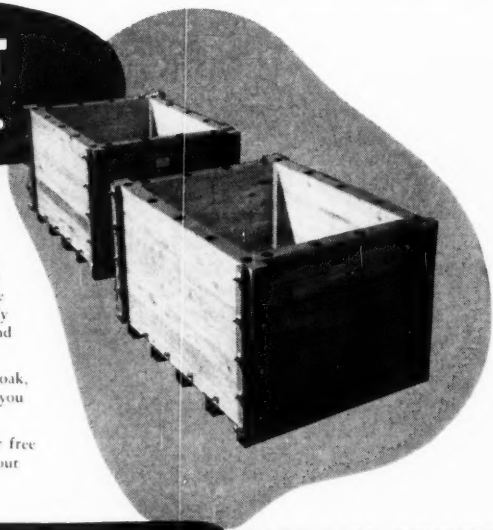

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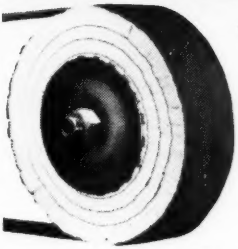

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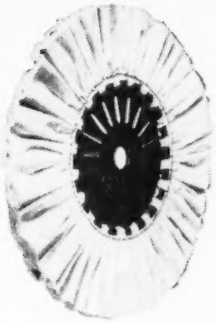

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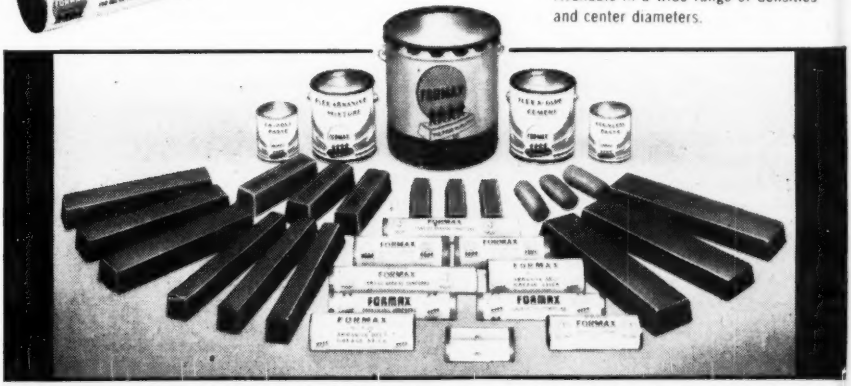

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paper bags, wood barrels or paper cartons, should most certainly be effected in a dry place. All containers should be placed on pallets, off the floor, out of danger from damage by passing traffic of all sorts encountered in the factory. Proper provision for "first in, first out" consumption will help avoid loss due to breakage of containers which are subject to deterioration. Good housekeeping (a fine policy anywhere), to the extent of keeping the weighing area sufficiently clean to permit any spillage to be swept up and used, will aid in stretching dwindling stocks.

Remembering that each phase of processing is affected by one or more of the foregoing phases, in using a nickel tank we will obtain the greatest benefit from our limited nickel supply if we consider the amount of nickel deposited on the steel surface as the key element in our process control. It is well known that such factors as time of immersion, bath temperature, strength, pH, amount of buffering substance and condition of steel surface all have their effects on the amount of nickel deposited. It is necessary then to determine in each plant the exact amount of nickel required to give the desired results under the existing conditions; namely, steel in process, firing procedure, enamels in use, and so forth, and to limit the application of nickel to this amount by controlling all the phases in the surface preparation process. Constant checks on weight of application are of prime importance in the conservation of nickel. The usual precautions against excessive carry-out, extraneous contaminants, and dilution and pH disturbance by carry-in must be observed.

Any one of several methods may be used to avoid dumping nickel tanks because of the presence of iron sludge. Operating with low pH (3.0 to 4.0) will retard the formation of such sludge. Commercial filters for continuous or periodic filtering of the bath are available. A sand filter may be placed in such a position that the solution may be pumped up to it and allowed to return to the nickel tank by gravity. The solution may be brought to pH 7.0-7.2 by the addition of caustic, aerated, cooled, and reclaimed after the iron sludge has settled. It is then made ready for use by bringing to strength and adjusting the pH with sulfuric acid.

Reclaiming of nickel salts from baths rendered unfit for further use may be resorted to as a possible source of nickel if the element of cost is of no moment. Iron and nickel are precipitated together, collected as filter cake and processed in the using plant or returned to the manufacturing supplier for separation.

Conservation of materials is only the application of common sense practice to everyday process, and may be accomplished by the careful analysis of the problems at hand and the establishment of rigid controls in each phase of metal surface preparation. It may well be that we will learn to do without some things which we were once wasting.

(Adapted for publication in PRODUCTS FINISHING from a paper presented at The Porcelain Enamel Institute's 13th Annual Shop Practices Forum.)

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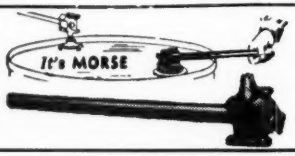

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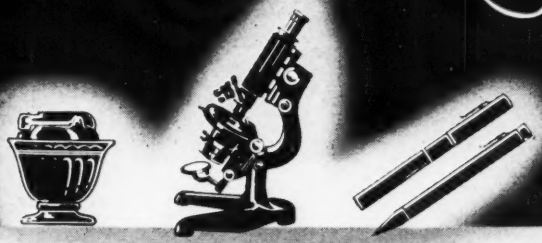

Rhodium is one of the six platinum group metals. It is hard and has an untarnishable brilliant white color. In electroplating, it produces beautiful results and is widely used for this purpose in jewelry — even precious metal jewelry. Its high reflectivity makes it excellent for mirrors for motion picture projectors and similar purposes. With restrictions upon usual plating metals, rhodium is the logical alternative for plating optical mounts, contacts for communication equipment, radar components, pen and pencil sets and a host of like objects.

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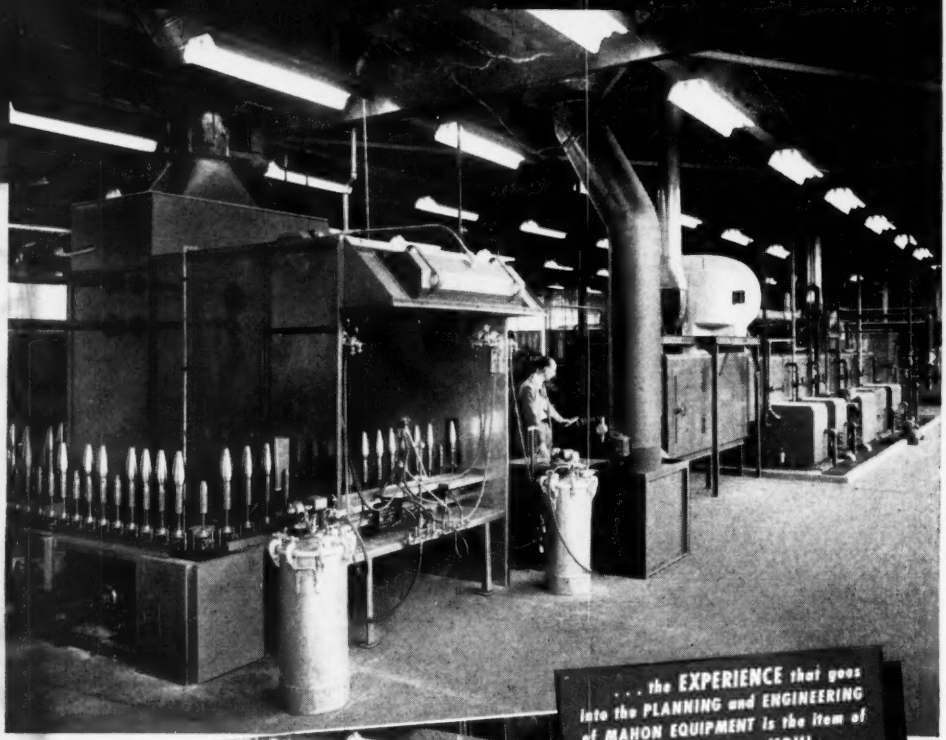

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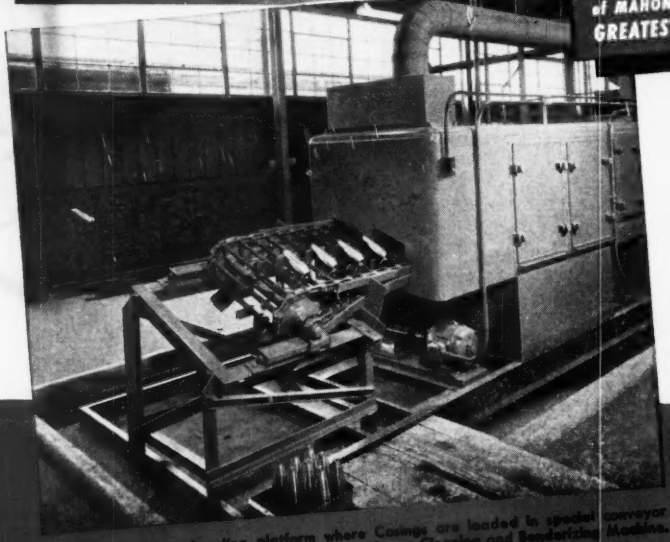

Above: Loading platform where Casings are loaded in special conveyor adapters at entrance end of Five-Stage Cleaning and Bonderizing Machine.

The illustration above shows the Complete Mahon Finishing System installed in the Cleveland Welding Company's plant, Cleveland, Ohio, for coating the inside and outside of projectile casings. It includes a five-stage Cleaning and Bonderizing Machine, Dry-Off Oven, a Semiautomatic Interior Spray Coating Machine, a Hydro-Filter Spray Booth designed with rotating device for conveyor adapters and special equipment for automatic spray guns which coat the exterior of the Casings.

M

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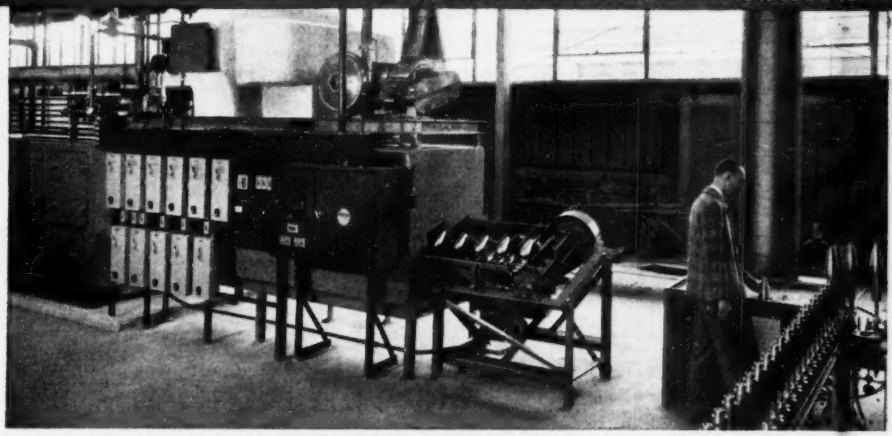
Finishing SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Projectile Casings Emerging from Dry-Off Oven and Receiving their Coat of Paint on Interior Surfaces.

Equipment for Military Paint Specifications . . . Equipment for Pickling, Bonderizing and Lubricating for Cold Extrusion!

On these pages you see a Complete Mahon Finishing System for automatically coating the inside and outside of projectile casings. The system includes a five-stage Metal Cleaning and Bonderizing Machine, a Dry-Off Oven, a semiautomatic interior Spray Coating Machine and a Hydro-Filter Spray Booth equipped with an adapter rotating device and automatic spray guns for coating the exterior of the casings. The finish is air-dried before casings are removed from the conveyor. Three men operate the entire system. If you are in need of equipment to meet Military Specification JAN C-490 Grade No. 1, or PA-PG 191, the Mahon Company has already installed many complete systems and are thoroughly familiar with these requirements. Mahon engineers have also produced equipment for processing projectile cartridge cases, as well as complete equipment for Pickling, Bonderizing, and application of drawing solutions in connection with cold extrusion operations. When you turn your equipment problems over to Mahon, you immediately enlist the services of the best qualified engineers in this field . . . engineers with a background of experience and a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Industrial Equipment Insert in Sweet's Mechanical Industries File, or write for Mahon's Industrial Equipment Catalog A-652.

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Military Uses of Organic Finishes

THE Quartermaster Corps is responsible for some 72,000 individual items of supply for the Department of Defense. It has been calculated that some 24 per cent of these items are coated with an organic coating of the paint, varnish or lacquer nature. This information was given by George J. Merritt, Quartermaster General's Office, Department of the Army, in discussing the Quartermaster Corps requirements before the Lacquer Panel, featured at the Industrial Products Finishes session of the 63rd Annual Convention National Paint, Varnish and Lacquer Association. Army Ordnance lacquer specifications were described by C. F. Pickett, Aberdeen Proving Ground. Military aircraft finishes were discussed by Alfred Malloy, Bureau of Aeronautics, Department of the Navy, and E. E. Jukkola, Wright-Patterson Air Force Base.

According to Mr. Merritt, the major portion of organic coating materials that are required by the Quartermaster Corps has been applied to an item by a contractor prior to receipt of the item by the Corps. Products include those of a commercial nature, wherein the durability requirements are much the same as the item would receive in industrial, commercial, or home use, and those having coating requirements based upon what is termed military requirements of the item.

By DR. ALLEN G. GRAY

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

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INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

Fig. 1 — Every type of Ordnance equipment is handled at Red River Arsenal, Texarkana, Texas. A 105-mm. howitzer, scheduled for the Mutual Defense Assistance Program, is sprayed with paint before shipment. (*Official U. S. Army Photograph*)

●

Army Ordnance Lacquer Specifications

Dr. C. F. Pickett, chief, Paint and Chemical Laboratory, Aberdeen Proving Ground, stated that Army Ordnance had recently introduced four new nitrocellulose base paint specfications representing the volume items of lacquer finishes used in Army Ordnance. These specifications are MIL-P-11414, MIL-L-11195, MIL-S-10181, and MIL-L-10182. MIL-P-11414 and MIL-L-11195, insofar as Ordnance is concerned, replace JAN-P-72 and JAN-L-73 respectively.

The new specifications were prepared in order to offer the manufacturer of Ordnance materiel latitude in the method of finishing. In time of emergency or heavy procurement many sub-contractors are called upon to manufacture certain components. Dr. Pickett pointed out that in some cases lack of equipment, physical shape or size, or other physical or chemical reasons may make the use of enamel types of finishes burdensome because air drying schedules for the enamel type are frequently much too slow for production lines, while baking may not be feasible because of lack of ovens or power requirements. With the existing Army Ordnance lacquer specifications it is possible to use nitrocellulose base systems for a wide variety of materiel.

MIL-P-11414 is a red oxide primer containing a small amount of rust-inhibiting pigment. It is generally applied over a properly treated metal where excellent adhesion is obtained quickly. Over bare steel full adhesion is reached in about 72 hours, though this can be greatly accelerated by the application of heat. Figure 1 shows a 105-mm. howitzer being spray painted at Red River Arsenal, Texarkana, Texas. Extensive testing has shown that MIL-P-11414 has very good adhesion over either bare or prosphated steel. Dr. Pickett postulated that this adhesion results from careful selection of inert pigments and the proper pigment to binder ratio by volume.

MIL-L-11195 is a hot spray lacquer specification which includes six colors plus black and white. While this specification deals with a lacquer in the lustreless range, the high performance is obtained by careful selection of inert pigments, and pigment-to-binder

to page 52→

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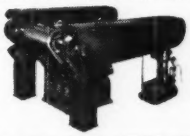

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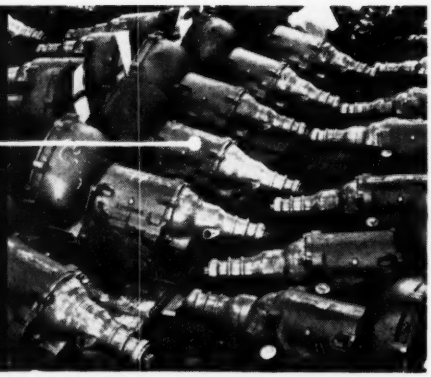

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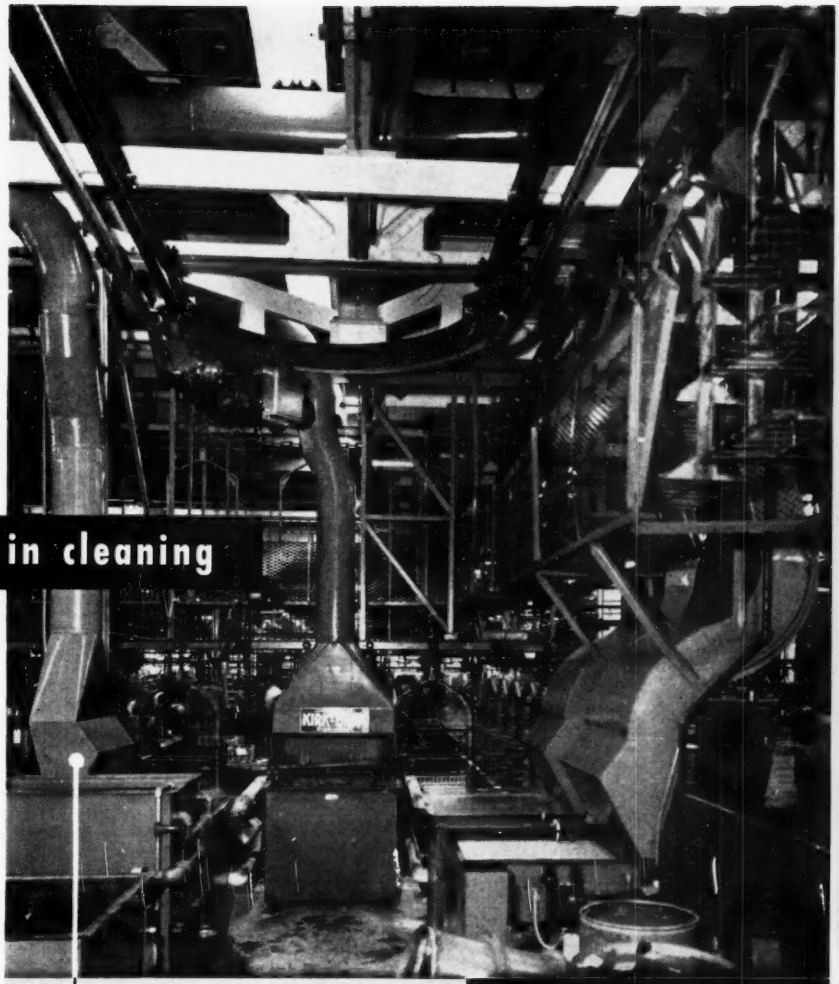

in cleaning

Cleaning tanks in the Finish Grinding Department of the Ford Automatic Transmission plant. These five tanks are fitted with KIRK & BLUM modified lateral cross draft hoods, which remove fumes below the operator's breathing level.

KIRK AND BLUM

FUME CONTROL SYSTEMS

ratio. This material was originally developed for ammunition and components, but Dr. Pickett predicted that it would probably be more widely used because of its good gasoline resistance.

MIL-S-10181 is a lacquer surfacer intended for use where smooth surfaces are required or to obtain high coverage.

MIL-L-10182 is the gloss lacquer intended for high gloss finish for such applications as staff cars, busses and ambulances. Work is in progress to include several colors in addition to the olive drab, and also to make possible application by hot spray. By careful formulation it is possible to obtain a reasonably high gloss without rubbing and polishing.

Dr. Pickett pointed out that the finishing of ammunition calls for the application of a grade I, JAN-C-490 phosphate treatment followed by a coat of MIL-E-10687. The lacquer specification MIL-L-11195 is offered as an alternate and will likely be used in many production lines. Where phosphate treatment is not desirable or possible it is recommended that the ammunition or components be given a prime coat of MIL-P-11414 to be followed by either the enamel or lacquer top coat. It is expected that considerable lacquer type formulas will be used in finishing tank and automotive items and components. In the finishing of tanks a coat of MIL-P-15328, followed by a coat of MIL-P-11414 and a coat of MIL-L-11195 olive drab is used for the exterior; a coat of MIL-P-15328, followed by a coat of each of the following is used for the exterior, MIL-P-11414, MIL-S-10181 and MIL-L-11195 white. Busses are currently being finished by the lacquer system.

Dr. Pickett emphasized the fact that the extended use of nitrocellulose lacquers on Ordnance equipment is new. In the development of the new lacquer specifications, quality and performance has been the goal.

For Quality and Uniformity Specify

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Air Force Finishing Requirements

Dr. E. E. Jukkola, Wright-Patterson Air Force Base, told the NPVLA panel discussion that aircraft require special finishes of high quality. They must be capable of withstanding abrasion during high speed flight, exhibit flexibility at temperatures of minus 65 deg. F. or lower encountered in Alaska or during high altitude flight, show resistance to high temperature, aromatic fuels, oils, hydraulic fluids, and so on, exhibit good weather durability, and possess a minimum of weight. The Air Force finishing requirements are covered by Specification MIL-F-7179, "Finishes and Coatings; General Specifications for Protection of Aircraft and Aircraft Parts." Contractors are required to submit a finish specification for each contract to indicate the protection against corrosion being provided for the aircraft and component parts. It is required that the protec-

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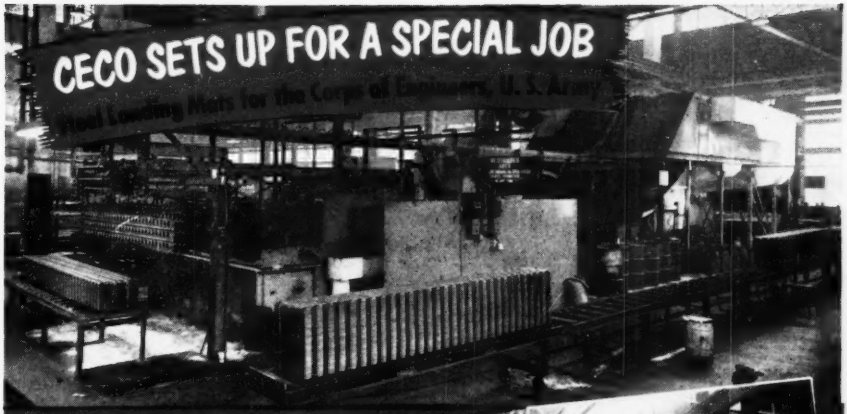

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Continuous Conveyor
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To meet a stepped-up production schedule for Uncle Sam, the Ceco Steel Products Corporation of Chicago, installed this DESPATCH Finishing System used for cleaning, painting and finish baking of airplane landing mats.

The system comprises a gas heated, 2-stage, dip cleaning unit with alkali wash and hot water rinse, a paint dip tank and single pass finish bake oven of bottom entry, "A" type design. The oven is gas-fired and operates at a maximum temperature of 350°F. Material is suspended from cross rods on a continuous conveyor, which returns to the loading zone over the top of the oven.

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DESPATCH CAN HELP YOU BOOST PRODUCTION

Through 50 years of continuous research and on-the-job experience Despatch engineers have been accumulating facts and figures on how to give you better, higher producing finishing systems. Today, you benefit by these years of experience when you call on Despatch to help you. Despatch engineers will gladly analyze your requirements . . . will plan, select, coordinate and install complete Finishing Systems or individual units.

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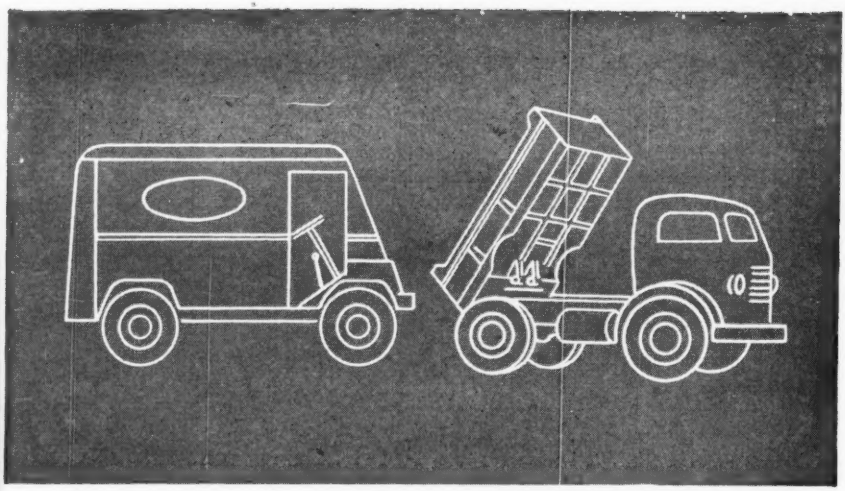
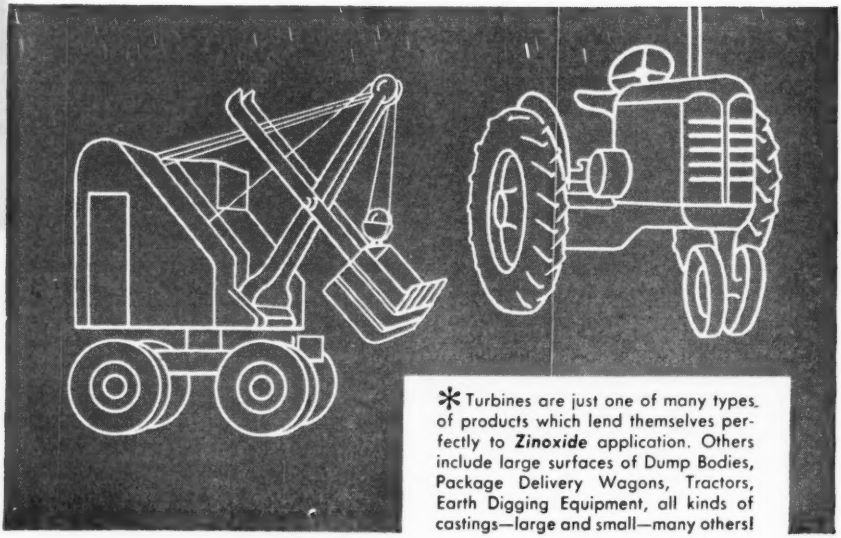
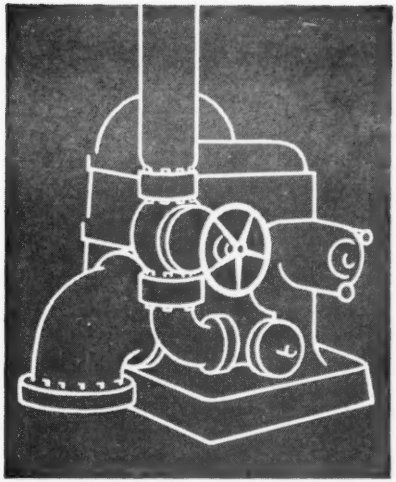


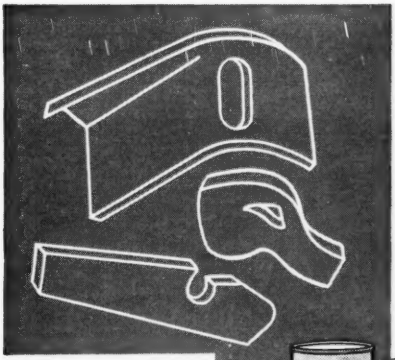
Lowe Brothers New ZINOXIDE problems of conventional



✻ Turbines are just one of many types of products which lend themselves perfectly to ***Zinoxide*** application. Others include large surfaces of Dump Bodies, Package Delivery Wagons, Tractors, Earth Digging Equipment, all kinds of castings—large and small—many others!



overcomes the metal primers



This advertisement is based on facts from Lowe Brothers industrial case history files.

Cuts finishing costs!

Having proved its superiority through several years of extreme testing . . . on every type of surface, in all climates . . . Lowe Brothers "Finishing Specialists" proudly offer *Zinoxide* for general industrial consumption. One series of *Zinoxide* tests was made by a large turbine manufacturer* who now uses it in place of a primer he had been using for 10 years. His tests proved that *Zinoxide* dried faster, gave a smoother surface, eliminated sanding, and had much greater durability!

Here are outstanding features of Lowe Brothers *Zinoxide* which assure better finishing results and effect new economies:

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- Quick drying! Dries to handle in 15 minutes!
- Can be baked at a temperature of 300° for 15 minutes or more.
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If you're interested in eliminating some costly finishing problems, call on a Lowe Brothers "Finishing Specialist" for additional factual evidence of *Zinoxide*'s superior qualities. Then put it to the test yourself! Write today.

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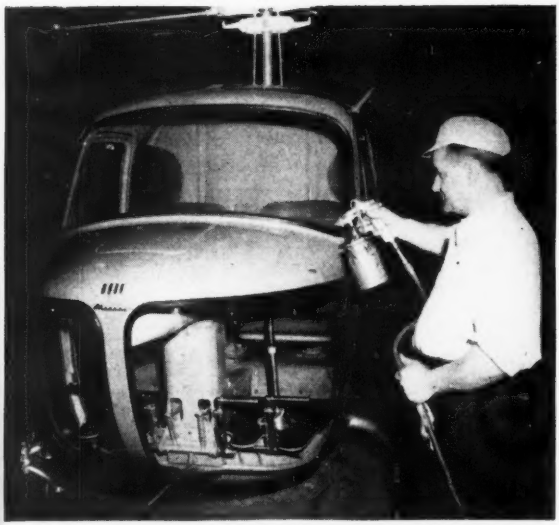
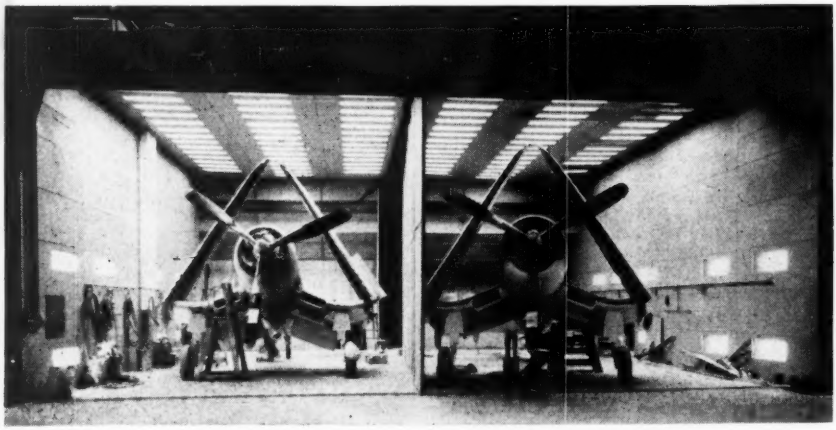


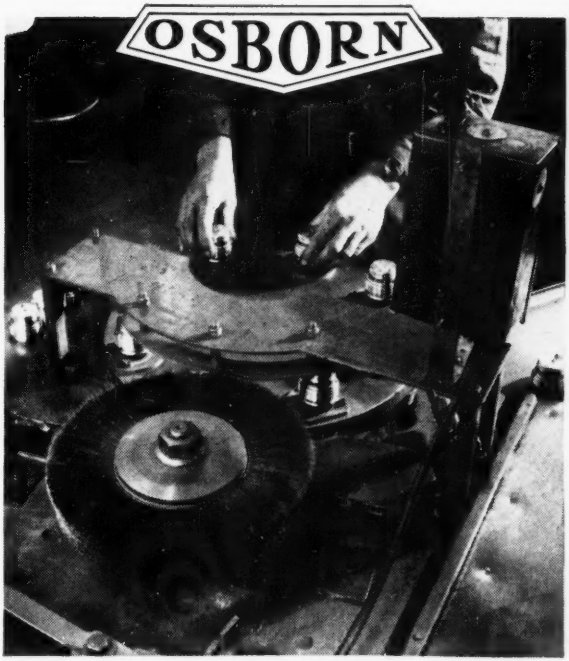
Fig. 2—Organic Spray Finishing Operation on a helicopter.
(Photo courtesy The DeVilbiss Company, Toledo 1, Ohio)

tive treatments and materials used in the finishing and coating of aircraft parts conform to the requirements of applicable specifications, and any deviations and use of alternate materials or processes be approved. Figures 2 and 3 show finishing being performed on operations aircraft.

In general it is required that all interior metal surfaces of the aircraft, such as wings and fuselage, be finished with a minimum of one coat of zinc chromate primer except magnesium surfaces which require a minimum of two coats. Exterior metal surfaces, when fabricated from Aluminum 2S, Aluminum Alloys 3S, 52S, 53S, 61S, Clad 17S, Clad 24S, Clad 75S, plated parts, corrosion resistant alloys and heat resisting alloys, generally are not painted except as necessary for

Fig. 3—This well lighted, two-section booth is used in spray finishing aircraft. It has a DeVilbiss air wash system with elevated water wash chambers and an air replacement system which provides over 120,000 c.f.m.
(Photo courtesy The DeVilbiss Company, Toledo 1, Ohio)





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Here's how a manufacturer of brass components for ammunition has stepped up production with Osborn Power Brushing:

In the removal of feather burrs from threads and the machined surface of these brass parts, former output was 400 per hour. With the help of the **O**sborn **B**rushing **A**nalyst, this company designed the brushing machine shown. The parts are placed on spindles of a rotating table. As they pass the Osborn Monitor Brush, they rotate and expose the entire face uniformly to the brush. Parts come clean and smooth . . . at a rate of 1400 per hour! And in another machine, Osborn Brushes deburr the internal threads of this part . . . smooth and fast!

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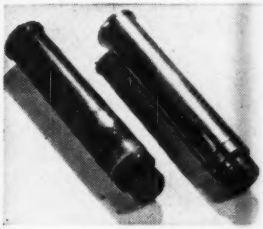
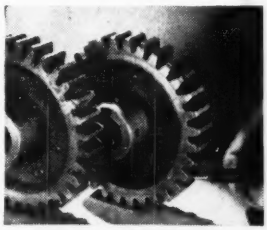
"CENTERLESS BRUSHING" speeds the production of fine finishes for cylindrical parts such as this compressor piston. One user of this Osborn-developed method gets micro-smooth finishes at outputs as high as 10,000 pistons per 8 hours. Can be applied to many sizes of parts and types of material.



CLEANS SCALE. Heat treat scale on the tube at the left is removed by Osborn power brushing. Result, shown at right, is perfectly clean surface, ready for painting. Have an **OBA** study your product cleaning operations to find ways to cut their cost.



FASTER DEBURRING. Here's another "before and after" example of gear deburring with the Osborn Work Holder Brushing Lathe. Burrs and sharp edges are removed uniformly. Production increases of 20% to 1570% are being reported by users.

WHAT'S YOUR PROBLEM?
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Fig. 4—A naval torpedo flask gets a thorough organic coating in every crevice and corner of the interior with this extension spray gun fitted with a 90 deg. nozzle. *(Photo courtesy The DeVilbiss Company, Toledo 1, Ohio)*

application of insignia, markings, antiglare coatings and such additional protection as may be specified. Requirements call for the finishing of exterior magnesium alloy surfaces with a minimum of two coats of zinc chromate primer plus one coat of enamel or two coats of lacquer. All other exterior metal surfaces, except those previously mentioned, are generally protected by application of at least one coat of zinc chromate primer, plus one coat of enamel or two coats of lacquer. Aluminized varnish, Specification MIL-V-6893, and aluminized lacquer, Specification MIL-L-7178 (superseding Specification AN-L-29) are most commonly used because of better durability and resemblance to the unpainted aluminum surfaces.

Large quantities of gloss lacquer, Specification MIL-L-7178, camouflage lacquer, Specification MIL-L-6805 (superseding Specification AN-L-21) and the corresponding enamels are used for the application and maintenance of insignia, radio call letters, identification and other markings on aircraft. Decalcomania are used to a limited extent for these applications. Specification MIL-L-6805 lacquer has been widely used for application of antiglare coatings, both in the cockpit and on external surfaces where reflection of sunlight from the aluminum surfaces might impair the pilot's vision. Lacquer tinted to match color No. 3430 of Specification TT-C-595 is often used for the interior of personnel spaces and cockpits to provide a more uniform color than obtained by tinted primer alone.

Maintenance procedures for elimination of corrosion (Fig. 4) and providing additional corrosion protection consists of treatment of the corroded area to remove corrosion, followed by application of zinc chromate primer and lacquer or enamel top coats to match the surrounding color. Dr. Jukkola pointed out that a survey of stock issues to Air Force depots over a recent six month period indicated a slight preference for lacquers versus enamels on the basis of number of gallons supplied. The shorter drying time, in spite of the two coat aplication required for lacquers, was given as the reason for this preference.

Aircraft Finishes For Special Purposes

Specification TT-L-54 covers an acid resistant spray lacquer for use on aluminum surfaces around storage batteries. A two-coat application over zinc chromate primer is required in aircraft to provide an acid proof coating on surfaces within 12 inches of storage batteries and other areas where acid

Rollacoat for economy

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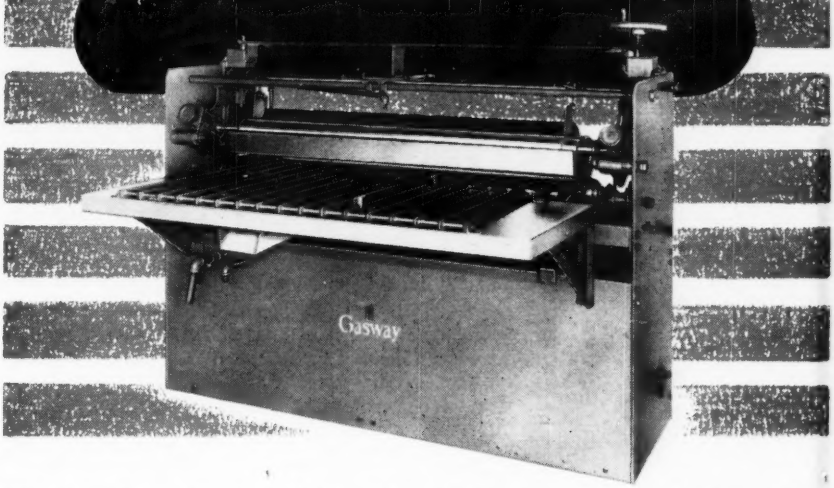

The benefits to be gained by using the Rollacoat method of applying finishes and protective coatings, to practically any type of flat materials, are three-fold. In the first place coating speeds are greatly increased over those of any other method and are governed largely by how fast the coated materials can be handled or dried. Secondly, the coverage per sq. ft. per gallon is usually at least 50% greater, the only loss being the paint removed from the rolls at the end of a run. In the third place you obtain finer quality of finish due to accurate control of thickness and eveness of coat.

The applications of Rollacoating are numerous. Top, bottom and sides of practically any type of flat material, whether sheet or coil stock, can be coated by a single pass through the machine.

Special equipment for cleaning, treating, coating, drying, and rewinding strip in continuous process can be constructed to special order.

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HASKELL, NEW JERSEY

spillage may occur. Specification 3595 Compound has reference to a material which is used to provide a corrosion protective coating to steel interior surfaces of fuel servicing trucks. However, Dr. Jukkola indicated that future procurements will be made under the superseding Specification MIL-L-6047. Use of Corps of Engineers Specification T-2399 Lacquer, Vinyl Resin-Gasoline and Water Resistant, has been recommended for the lining of fuel servicing and crash fire truck tanks.

Cellulose nitrate dopes are specified for use on fabric covered surfaces still found on the control surfaces of other than high speed fighter aircraft. The finish, according to Specification 98-24100, consists of two brush coats plus two spray coats of clear dope, Specification MIL-D-5553 (superseding Specification AN-TT-D-514) to provide a dry clear dope coating weighing between 2.5 and 3.5 ounces per square yard followed by two spray coats of aluminized dope, Specification MIL-D-5552 (Specification AN-TT-D-551); pigmented dope, Specification MIL-D-5554 (Specification AN-TT-D-554); or camouflage dope, Specification MIL-D-5555 (Specification AN-D-8).

The extent of future applications for lacquers in finishing aircraft will depend largely on industry's successful development of materials to meet special needs. Some problems cited were: coatings resistant to rain erosion; a flexible aerodynamic smoothing material with good adhesion; a heat reflecting coating to provide cooler interior temperatures for parked aircraft; finishes for magnesium surfaces; a coating resistant to ester base hydraulic fluids; a conductive coating for dissipation of static; durable clear corrosion resistant coatings.

Requirements of Military Aircraft Coatings

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HIGH TEMPERATURE LUCITE CYLINDER

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equipped with

HIGH TEMPERATURE LUCITE CYLINDER

- Cylinder automatically lowers into exact position, and engages driving gears and electrical contact without attention from operator
- Anode rods, conductors, switches and connections are all completely insulated from tank
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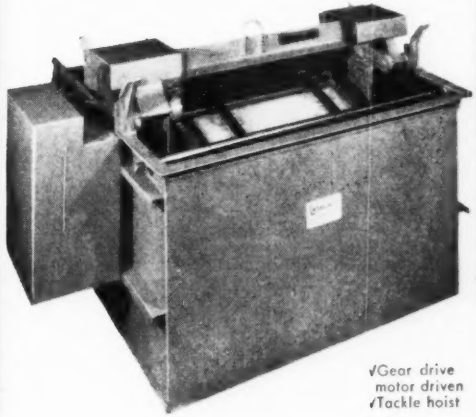
- Selective 3-speed drive. Hand or tackle hoist. Ratchet mechanism suspends cylinder in any position
- Easy, fast lowering, raising, loading and unloading
- Nothing plates but the load!



√Gear drive motor driven √Tackle hoist

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NPVLA group some of the basic properties of organic coatings necessary to provide optimum performance on high speed aircraft. Exterior finish is at present employed on naval aircraft to prevent corrosion and deterioration of the structure and for purpose of color, identification, camouflage and pilot morale. Lacquer has served the purpose remarkably well, but with the advent of higher and higher speeds, it has become obvious that the present lacquer-primer finish is now inadequate.

Some structural materials, such as clad 75ST aluminum alloy, magnesium alloy, glass fabric, plastic laminate, and so on present adhesion difficulties and/or serious deterioration or corrosion problems. The leading edges whether fabricated from metal or plastic, require a special type of coating resistant to erosion or rain or other precipitation at speeds in excess of 400 miles per hour. Mr. Malloy pointed out that the current lacquer-primer finish may stand up for only approximately a minute in rainfall at such speeds. Methods of application require simplification to speed up production of new aircraft and overhaul. It is desirable that the time lag before a painted airplane is delivered to the "flight line" be reduced to a matter of hours, rather than days. The development of refinishing materials that are less sensitive to temperature and humidity conditions during application is also being studied.

The finish of the predictable future for the general airplane finishing schedule should be scuff-resistant to withstand the inevitable mishandling, foot traffic on the paint, and generally rough usage by personnel in the fueling and maintenance of the aircraft, particularly under combat conditions. Also, outstanding adhesion is a must, in order to resist the excessive vibration, oil-canning and other influences which may result in removal of the cur-

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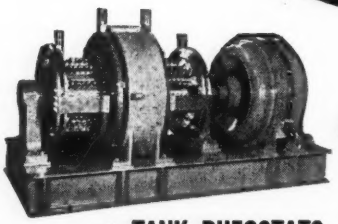

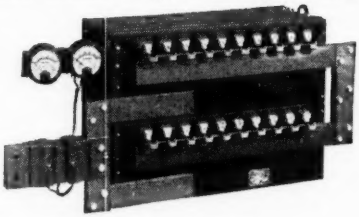

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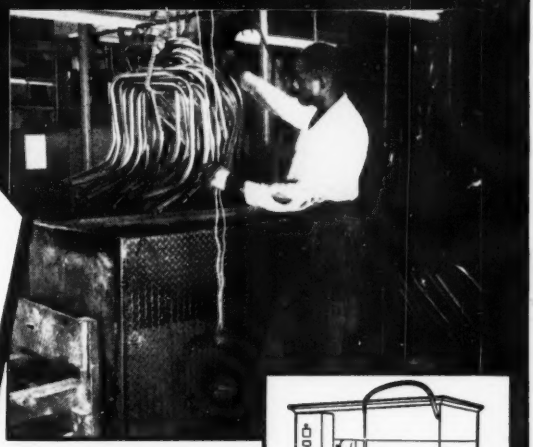

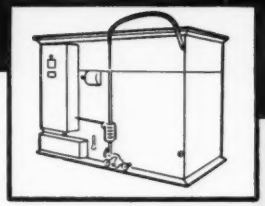

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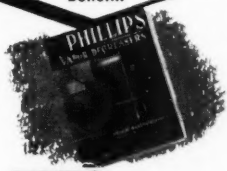

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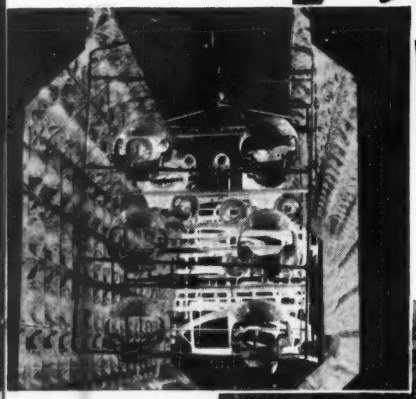
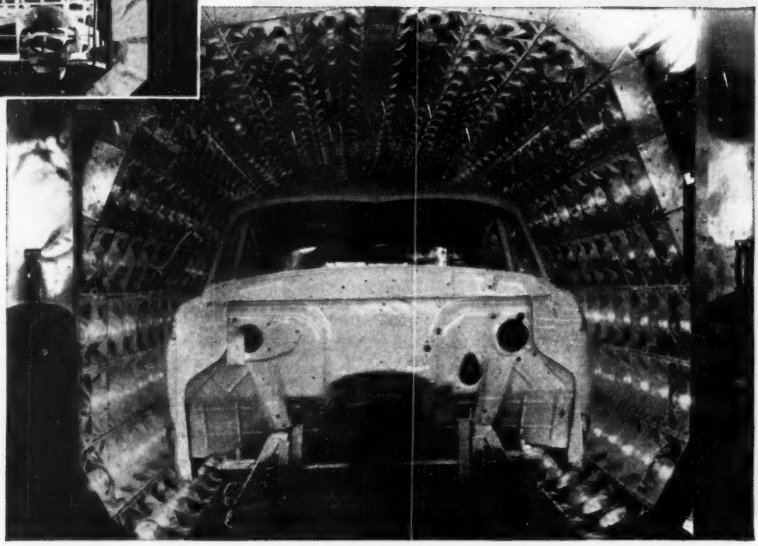




TYPICAL FOSTORIA OVENS AT KAISER-FRAZER CORPORATION

Larger picture shows oven for body finish baking. Controls vary heat for baking prime coat at 350F for 12 minutes and finish lacquer coat at 175F for 12 to 15 minutes. Inset picture shows smaller oven used for baking prime and finish coats on smaller parts.

SEND FOR COMPLETE FACTS — Write for this brochure of technical facts on Infra-red with case histories of many installations. Tell us about your particular problem and we will include data directly applicable to your operations.

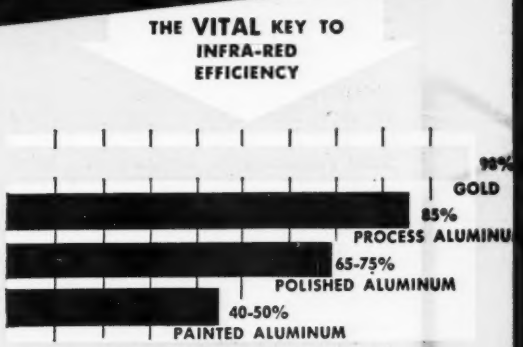
THE FOSTORIA

OF ALL INDUSTRIAL OVENS

-RED BAKES FINISHES

- So Uniform – So Low Cost

A Fostoria Infra-red oven is a lot more than a collection of lamps. Only Fostoria has Gold Plated Oven Walls and Evenray Reflectors — *the vital key to Infra-red efficiency.* Only Fostoria *directs, reflects and redirects* Infra-red rays *uniformly* with the *highest production utilization of energy.* No other equipment can match the speed, quality, and low "per piece" cost of Fostoria finish baking. Everywhere, finishing departments are cutting costs, speeding production, saving floor space, saving manhours by modernizing with Fostoria Infra-red ovens. Get the complete facts, now. Case histories of installations applicable to your production are available on request.



GOLD PLATED OVEN WALLS

Gold is by far the best reflector of Infra-red rays, 98% efficient. There is practically no energy loss through the gold plated Fostoria oven walls. Use of any other reflecting surfaces would absorb and waste 15% to over 50% of all Infra-red rays. (See chart). Obviously, the KW consumption per unit production is much less with a Fostoria oven.

EVENRAY REFLECTORS

Fostoria gold plated reflectors are scientifically designed to direct and uniformly distribute energy on the product being processed. There are no hot spots. Whatever the critical temperature of the finish is, Fostoria ovens produce the temperature *evenly* over the whole product surface. Only Fostoria has these vital features.

- **Highest productive utilization of energy — lowest energy loss**
- **Uniform heat distribution to all product surfaces**
- **Instantaneous heat, instantly controlled — no stand-by time — no overheating**
- **Lowest unit production cost and finest, most durable finishes**
- **Listed by Underwriters' Laboratories, Inc.**

INFRA-RED Fostoria OVENS

PRESSED STEEL CORPORATION, Fostoria, Ohio

Oldest and Largest Manufacturers of Industrial Infra-red Ovens

Table I

PROPERTIES OF AIRCRAFT FINISHES

CHARACTERISTIC	REQUIREMENT
Tensile Properties	High tensile strength and high elongation at rupture.
Thickness of Finish System	0.003 inch maximum
Weather Resistance	More than two years on Florida outdoor exposure before incipient failure.
Scuff resistance in thickness of approximately 0.003 inch.	Must resist excessive but unavoidable field mishandling, such as scuffing by shoes, impact from ladders and gasoline hose nozzles, and so forth.
Adhesion to clad 75ST aluminum, FS-1 magnesium and glass fabric laminate.	Satisfactory as determined by adhesion test methods.
Resistance to non-flammable hydraulic fluid MIL-F-7083 (Aer) 51F22 (Aer) for 1 week.	Satisfactory
Low temperature flexibility (-55 deg. F.)	Shall withstand a 180 deg. bend test around a ½-inch mandrel.
Softening temperature	Above 250 deg. F. before first indications of softening.

(Based on data presented by Alfred Malloy, Bureau of Aeronautics, Navy Dept., before the Lacquer Panel at the 63rd Annual Convention of the National Paint, Varnish and Lacquer Association.)

rent lacquer finish. All possible steps are being taken to improve the adhesion by careful attention to surface preparation, cleaning procedures and application techniques. Wash primer is being used to an increasing extent to further improve the adhesion of the present standard primer-lacquer finishing system.

Mr. Malloy pointed out that the desired aircraft finish should have a minimum durability of two years before incipient failure, have universal applicability to a variety of aircraft structural materials, and require a minimum of surface pretreatment or preparation. Some of the properties of the finish which have been established as the desired goal are summarized in Table I. Elastomeric coatings have been considered. An example of one type of finish soon to be service test flown, in addition to the most promising proprietory offerings to date, consists of wash primer, plus a vinyl anti-corrosive primer, followed by a vinyl-lakyd topcoat.

Tests for Military Finishes

Mr. Malloy discussed some of the tests useful in establishing suitability of finishes. The tape adhesion test and examination for absence of blistering should be conducted on panels placed in a humidity cabinet at 120 deg. F., 95 to 100 per cent relative humidity, for 30 days, by removing the panel from the humidity cabinet and after wiping off surface moisture, applying a piece of Federal specification UU-T-106 masking tape and then pulling it off with one abrupt motion. The paint should be examined for signs of failure. This examination should be sup-

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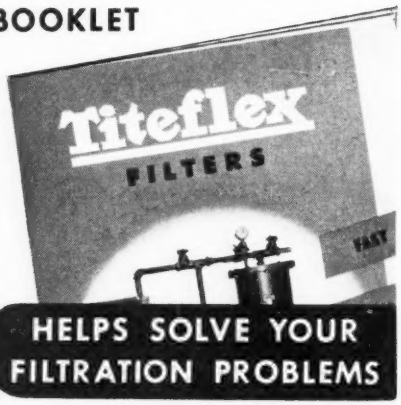

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plemented by observation of a dry panel under a binocular microscope at 30X magnification when manipulated with a blunt, steel needle, for obvious physical characteristics.

Properties such as tensile strength and elongation at rupture are conducted on free films of the material, prepared on amalgamated tin panels or other appropriate methods. The Scott Inclined Plane tester was stated to be a good instrument for running film strength and elongation tests. Malloy stressed the worthwhile character of tests on free films, stating that in no other way can the tensile properties of the material be so accurately verified.

For hull bottoms, it is required that the finish will withstand soaking in water for several months, without any impairment of adhesion or film properties. The finish must also stand up under conditions of taxiing through water at high speed. The incorporation of antifoulants to resist marine growth and barnacle attachment is a very important additional requirement. For leading edges, a highly extensible finish, with instantaneous rebound, having outstanding adhesion to plastic and metal, and embodying an anticorrosive primer in the case of the metal finish is needed. Government aeronautical workers have contributed test methods of benefit to the entire organic coatings field; specifically: The Ultracentrifugal Adhesion Tester; the Air Force High Speed Rain Erosion Tester; the new ASTM Ring-and-Ball Softening point Test Method; and the NRL Filmeter.

* * *

Electropolishing of Silver Shows Cyclic Behavior

STUDIES have been conducted at Armour Research Foundation to

to page 72→

HOT Lacquer NEWS

PUBLISHED PERIODICALLY BY HERCULES POWDER COMPANY IN THE INTERESTS OF BETTER FINISHES AND FINISHING

Western Electric Now Reconditions Telephone Equipment With Hot Lacquer

Switchboards, Booths, and Coin-Boxes Finished Faster and Better with One Coat Hot-Spray

Telephone Sales Division of Western Electric Company, Inc., which maintains the repair shops for reconditioning telephone equipment, reports reduced work in process, elimination of storage between coats and less spraying equipment per shop since switching from two coats of cold lacquer to one coat of hot lacquer. Because hot lacquer finishes are relatively unaffected by varying humidity conditions, blushing has been greatly reduced. Another advantage is that one Western Electric lacquer specification is now being standardized for all 28 repair shops.

Learn more about hot lacquer for industrial and defense finishes—write for information and government specifications on lacquer.

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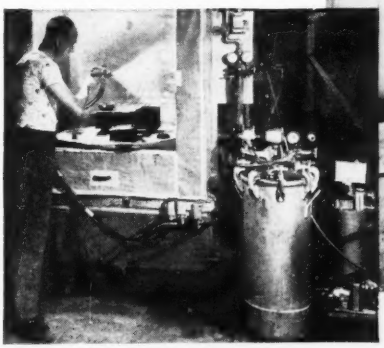
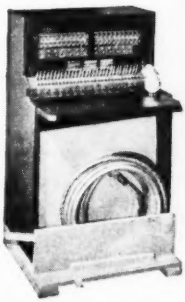
INCORPORATED
Cellulose Products Dept., 927 Market St., Wilmington 99, Del.

Telephone booth gets "new look" with hot lacquer



Reconditioned coin-box being sprayed with hot lacquer

Hot lacquered switchboard crated and ready for shipment



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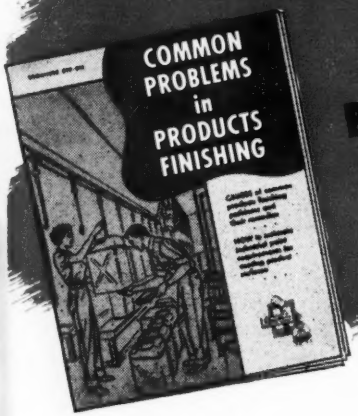

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determine the effect of voltage regulation on the cycling observed in the anodic electropolishing of silver in a cyanide solution. The work, which was recently reported by H. T. Francis and W. H. Colner in the "Journal of the Electrochemical Society," was a part of a larger program directed toward improvement of electropolishing techniques. Periodic fluctuations in current

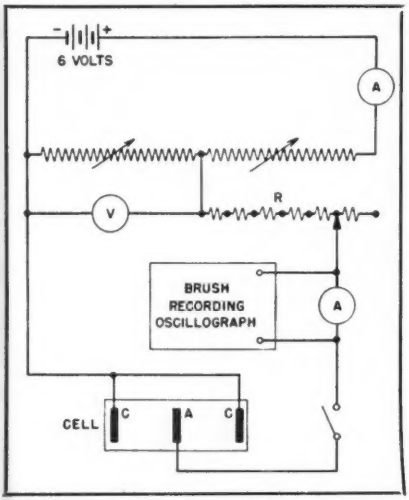


Fig. 5—Schematic electrical circuit used in silver electropolishing studies at Armour Research Foundation.
(Illustration courtesy Electrochemical Society, New York N. Y.)

(cycling) have been noted for a number of electrode reactions. These include both anodic and cathodic processes. The banding encountered in electrodeposition of alloys is an example of cathodic cycling, while electropolishing of certain metals gives rise to periodic fluctuations in the current due to alternate formation and dissolution of an anodic film.

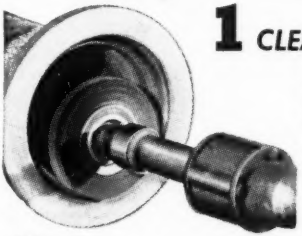
Variables which have been recognized as affecting the cycling characteristics are solution composition, temperature, agitation, and preparation of specimen. However, as pointed out by Francis and Colner, very little attention has been given to the effect of the electrical source on the cycling. In particular, little study has been given to the effect of voltage regulation, that is, the ability of the power source to maintain constant voltage at varying current loads. All data reported were obtained using a silver electropolishing bath of the following composition:

Constituent	Concentration
Silver cyanide (AgCN)	43.5 gm./l.
Potassium cyanide (KCN) Free	45 gm./l.
Potassium carbonate (K_2CO_3)	89 gm./l.

The electropolishing bath was used at room temperature (72-77 deg. F.). Specimens for use in the tests were prepared prior to each run by depositing 0.0001-0.0003 inch of silver on a pure silver base. Specimen size was 1 by 2 inches, immersed in the electropolishing bath to a depth of 1.25 inches. The cathodes were pure silver and were 2 by 4 inches, immersed 2 inches. The specimen was placed centrally between two cathodes with an anode-to-cathode spacing of 2 inches. The arrangement used in these Armour Research Foundation studies is shown in Fig. 5, together with the electrical circuit used.

The circuit consisted of a simple potentiometric source in which a current of about 10 amperes was passed through two carbon pile rheostats. Since the current drawn by the electrolytic cell was of the order of 0.4 ampere, very little variation in source voltage was produced by fluctuations in load current. Thus, the source had good regulation. In order to provide variable regulation in the voltage supplied to the cell, a tapped fixed resistor R was inserted. Taps were provided at several points so that this resistance could be varied in steps from 0 to 15 ohms. The Brush oscillograph (Model PGR) was used to study the cyclic electrode phenomena. It has a frequen-

Pittsburgh Brushes Solved these Problems!



1 CLEANING RED-HOT CASTINGS in 30 seconds!

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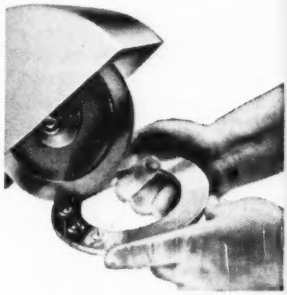

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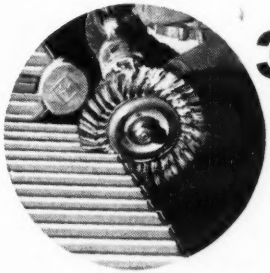
When the Edwin L. Wiegand Company wanted to remove ragged edges from their *Chromalox* Heating Units economically and *fast*, they turned to rough, tough Pittsburgh Brushes for the answer. The 6" Pittsburgh steel wire brushes they installed polish 10,000 heating units during their life.



3 CLEANING WELDS in close quarters!

Allis-Chalmers' problem was to find a brush narrow enough to fit between cooling fins of transformer radiators, yet strong enough to remove slag and spall on welds which could conceal pressure-reducing pinholes. Pittsburgh engineers recommended an 8" rotary wire brush. Problem was solved!

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cy response of 1-120 cycles per second and chart speeds of 5, 25, and 125 mm./sec. When operated with its amplifier, current records could be obtained from the voltage drop across the ammeter shunt. It was reported that in all cases in which cycling was observed, the average bath current was 0.38 to 0.44 ampere.

Certain general observations were drawn from the data. The portion of the cycle representing the depolarization and the beginning of polarization is rapid, while the remaining part of the polarization cycle is slower. The amplitude of the current oscillations seems to be maximum at intermediate voltages for each resistance value. Maximum frequency is obtained with minimum series resistance, that is, greatest voltage stability. The nature of the electropolishing action was observed for each run. Best polishing was obtained at highest frequencies, which in turn were produced by greatest voltage stability.

Francis and Colner pointed out that the theory of alternate film formation and breakdown appears to explain the phenomenon observed in these studies. Based on the above theory, the mechanism of the electropolishing cycling effect was postulated. At the beginning of a cycle, a relatively high current flows. This results in considerable concentration polarization at the anode, i.e., decrease in CN^- and increase in Ag^+ concentrations. Consequently, the current decreases rapidly. A point is reached where the solubility product of AgCN is exceeded, and precipitation and film formation takes place. This corresponds to a pip in the polarization curve. The momentary increase in the current may be due to the sudden removal of Ag^+ by precipitation from the supersaturated solution. The remainder of the polarization cycle represents film buildup, resulting in further decrease of the current and

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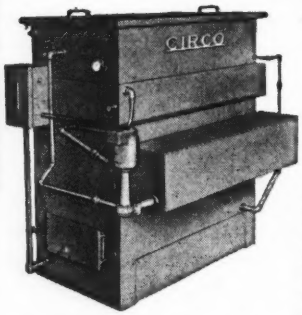
SAVE TIME MANPOWER with CIRCO VAPOR DEGREASERS



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How many of you use

Here is a list of the most important Parker Products used in the metal working industry today. It's an expanding list, growing as Parker research develops new products to broaden the field of metal treatment.

Some of these products add durability and protect appearance by anchoring the paint and controlling corrosion. Another enhances performance and prolongs the life of wearing surfaces. Others bring important benefits to production lines, making new techniques practical, improving conventional operations.

Every Parker Product listed here has proved itself. Each one is formulated and manufactured to the high Parker standard of quality to work for you with highest efficiency, dependability and economy.

☐ BONDERITE

The standard surface preparation method for metals to produce paint finishes of highest quality. Bonderite converts the surface to a nonmetallic phosphate coating, integral with the metal, which is an excellent anchor for paint and an effective corrosion resistant. An adaptable product, simply applied in spray or immersion equipment, easily controlled for dependable results. Used widely, on the world's most famous and admired manufactured products.

☐ BONDERITE AND BONDERLUBES

Cold forming of metals is faster, easier, and more economical of time and metal because of this proven combination. Bonderite and Bonderlube combine to form a lubrication system that makes metals flow smoothly, lengthens die life, cuts metal loss. Years of experience are behind this Parker development—90% of all seamless steel tubing (and millions of feet of welded steel tube) is drawn with Bonderite. Many Ordnance items are now being manufactured with this aid.

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

these **PARKER PRODUCTS** do to make your metal products better?

☐ **PARCO LUBRITE**

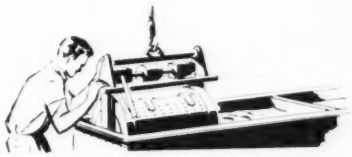
On gears, cylinder walls, pistons, rings, shafts, valves and rods, Parco Lubrite is used to create a nonmetallic phosphate coating on the metal. This coating holds lubrication under pressure, prevents metal-to-metal contact and resulting scuffing and scoring during initial operation. The smooth, easy break-in with Parco Lubrite makes for longer subsequent service life.

☐ **PARCO COMPOUND**

For 35 years, this Parker product has meant quality rust resistance for iron and steel. The dense crystalline phosphate coating becomes integral with the metal and forms an excellent base for rust preventive oil or paint finishes. Any iron or steel article, small or large, simple or complex, may be treated with Parco Compound.

☐ **PARCOLACS**

A useful group of specialized products made up of various finishes for use after Parco Compound. Includes wax base finishes, stains, and rust preventive oils suitable for dip, spray or centrifuge application. Available for quick or slow drying requirements. Parcolacs add desirable appearance and performance qualities to articles treated.



☐ **PARCO CLEANERS**

An outstanding line of metal cleaners formulated to condition the metal for the next step in finishing, as well as to remove grease and soil efficiently. Alkali, acid, and emulsion types, each formulated to meet certain conditions of soil, production requirements, and finishing operations which follow

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anode dissolution rate to very low values. Sufficient free CN can now diffuse to the anode to redissolve the film. This is the depolarization part of the process and completes the cycle. As noted above depolarization occurs rapidly and appears to be independent of voltage. On the other hand, the polarization rate increases with voltage. Therefore, for a given value of series resistance, higher voltage produces higher cycling frequency, up to the region of unstable cycling.

* * *

Plating On Stainless Steel

TENTATIVE recommended practice for preparation of and plating on stainless steel recently developed by A.S.T.M. Committee B-8 on Electrodeposited Metallic Coatings* sets forth three basic steps in the following order: removal of scale; removal of oil, grease or other foreign material by cleaning; activation immediately before plating. Various metals are electrodeposited on stainless steel for such purposes as color matching, lubrication during cold heading, spring coiling, and wire drawing operations, reduction of scaling at high temperatures, improvement of wettability (as in fountain pens), improvement of heat and electrical conductance, prevention of galling, jewelry decoration, and staving off superficial rusting where appearance is important.

The surface of stainless steel is normally resistant to a wide variety of corrosive elements. This property has been attributed to the presence of a thin transparent film of oxides. It is impractical to obtain an adherent electrodeposit over this film. However, once this film is removed by a surface activation treatment, and kept from reforming until the surface has been covered with an electrodeposit, any of the common metals may be electrodeposited successfully.

Scale on stainless steel, as the result of heat treatment during or subsequent to fabrication or forging, must be completely removed to obtain satisfactory adhesion of the electrodeposit. Two basic methods are used: mechanical methods such as tumbling and sandblasting; chemical methods, such as pickling in acid solutions or in molten salts. Various cleaning procedures have been used prior to plating, including spray cleaning, vapor degreasing, soak cleaning, and electrocleaning. In anodic electrocleaning, when brightness is important, alkalinity should be kept as low as the part will permit.

Activation

After the cleaning operation and prior to plating, the stainless steel parts must be completely activated

* A.S.T.M. Designation: B254-51 T, Issued 1951.

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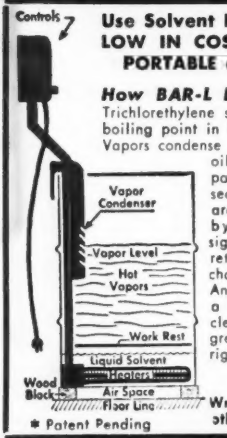

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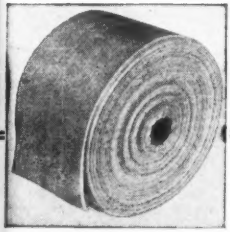
to remove the thin transparent film of oxides from the surface to be plated. This film will reform if parts are allowed to dry or are exposed to oxygen-containing solutions. For this reason it is important that the shortest interval practical should elapse between the time the parts are removed from the activating solution and covered by the electrodeposit.

A number of activating procedures are described in the A.S.T.M. tentative recommended practice. One suggested practice employs cathodic treatment in a 5 to 50 per cent sulphuric acid solution at room temperature, for 1 to 5 minutes, at a current density of 5 amp./sq. ft., or using 5 to 50 percent hydrochloric acid with a current density of 20 amp./sq. ft. A two-step activation procedure consists of immersion in hydrochloric acid (10 to 30 per cent) at room temperature, followed by cathodic treatment in 5 to 50 per cent sulfuric acid. Immersion in a 20 to 50 per cent sulfuric acid solution at 150 to 180 deg. F. (use higher temperature for the lower concentration) for at least one minute after gassing starts is another activated method. This treatment will produce a dark, adherent smut which is removed in the plating bath. An activation method that has been used with success for chromium plating on stainless steel automotive parts in a conveyorizer process involves immersion in a solution of 0.1 per cent hydrochloric acid plus 1.0 per cent sulphuric acid at room temperature for 26 seconds.

Other procedures utilize a simultaneous activation-plating treatment. One method involves anodic treatment at 20 amp./sq. ft., for 2 minutes, at room temperature, in a solution made up of 32 oz./gal. of nickel chloride plus 11 oz./gal. of hydrochloric acid. This is followed by cathodic treatment in the same bath for 6 minutes at 20 amp./sq. ft. A procedure that has been



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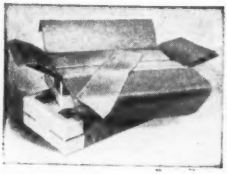

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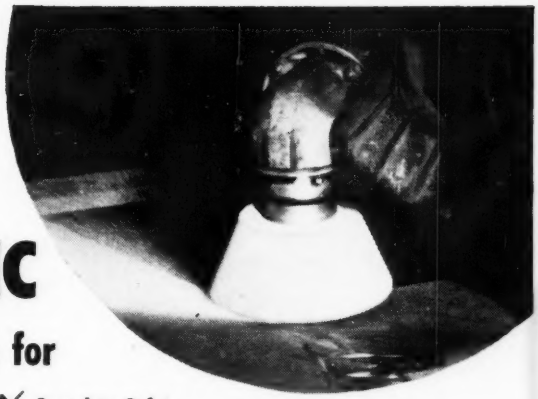

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used in the automotive industry for nickel plating on 18Cr-8Ni stainless steel uses a cathodic treatment at 10 volts in 65 per cent sulfuric acid for 2 minutes at room temperature, followed by cathodic treatment at a current density of 150 amp./sq. ft. for 2 minutes in a bath made up of 32 oz./gal. nickel chloride plus 12 per cent hydrochloric acid. Parts are then transferred without rinsing to a Watts (or higher chloride) nickel bath at a pH of 1.5 to 2.0. Methods are available for plating adherent deposits of the common metals, cadmium, copper, brass, chromium, gold, nickel, or silver, directly on stainless steel provided the surface of the stainless steel is activated.

* * *

Chromium-Alloy Coatings

VARIOUS modifications of fundamental chromizing processes have been used to produce chromium-alloy coatings on iron and steel. Work conducted by T. P. Hoar and E. A. G. Croom and recently reported in the "Journal of the Iron and Steel Institute" (British) has shown that mild steel exposed to atmospheres containing chromus chloride at 1733-2012 deg. F. becomes coated with a chromium-alloy layer due to the reaction:

$$CrCl_2 + Fe \rightarrow Cr + FeCl_2$$

If the atmosphere contains hydrogen, chromizing is said to be due to the following reaction:

$$CrCl_2 + H_2 \rightarrow Cr + 2HCl$$

The latter reaction was stated to proceed catalytically on the growing surface. Chromium-alloy coatings produced in the experiments contained about 20 per cent chromium. Chromium powder was used for generating chromus chloride vapor by direct reaction with hydrogen chloride. The chromium-alloy coating was produced

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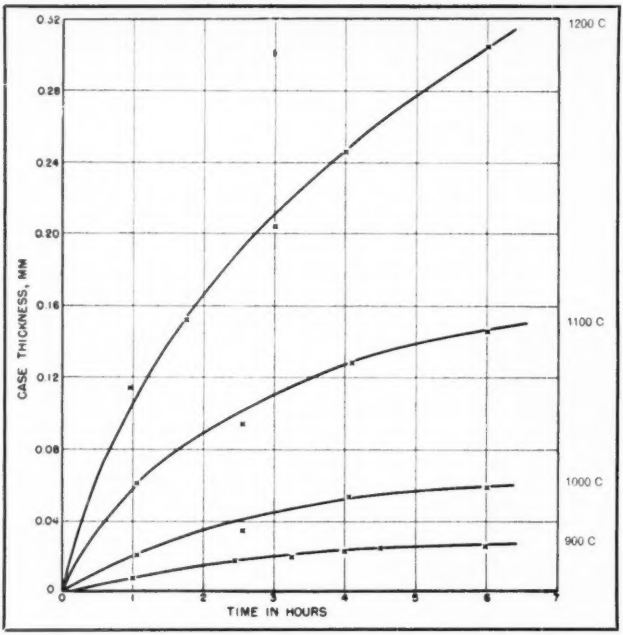


Fig. 6—Effect of time and temperature on thickness of chromium-alloy coating obtained in chromizing Armco iron by the salt bath method. (*Illustration courtesy Electrochemical Society, New York, N. Y.*)

by treating mild steel in the chromus chloride vapor. Hydrogen and nitrogen were used as carrier gases.

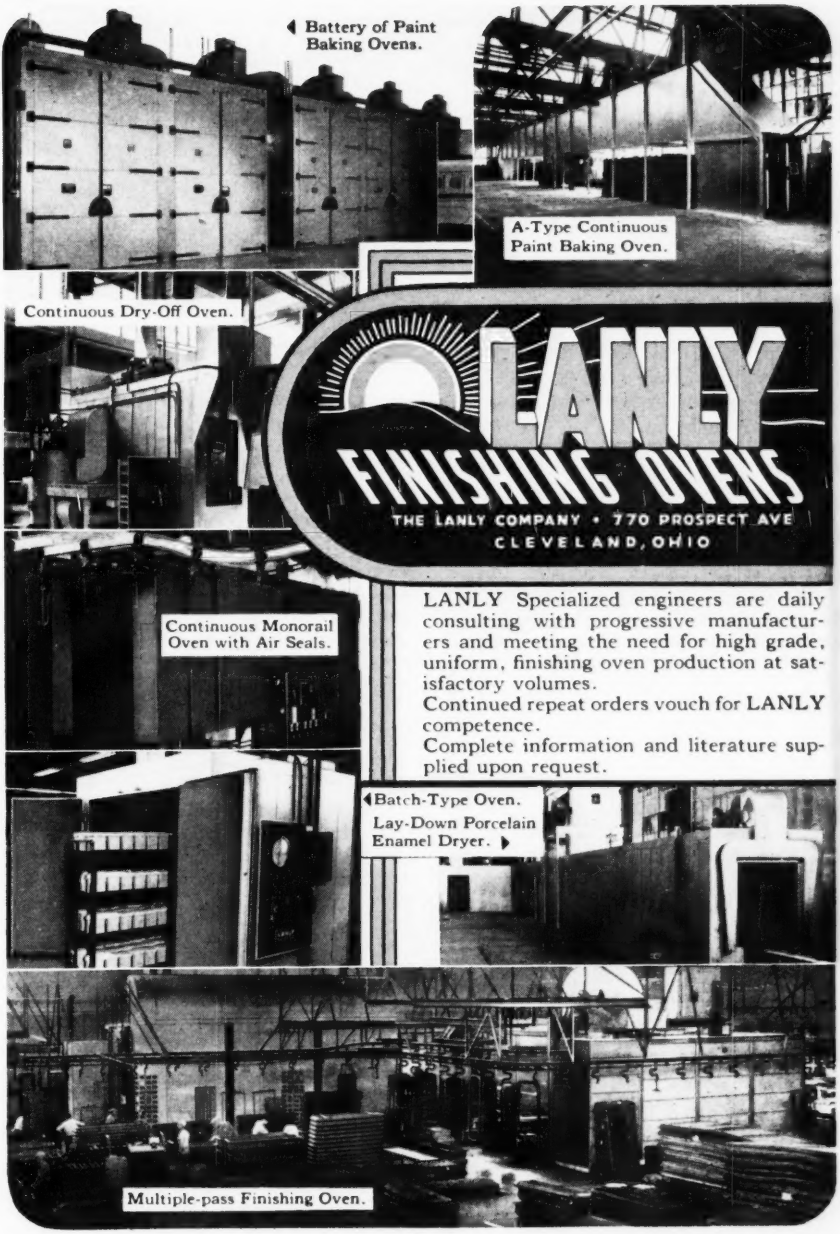
Composition of Chromium Alloy Coatings

Analysis of a number of coatings, stripped by dissolution of the underlying metal in dilute nitric acid, gave values for chromium content from 18.5 per cent to 22.8 per cent with a mean of 20.0 per cent. These coatings were produced by treatments of 2 to 15 hours at temperatures from 1744 to 1922 deg. F., and there was no correlation between the mean chromium content of the coating and either time or temperature of treatment. It was postulated that all chromized coatings on mild steel produced by gaseous treatment within these ranges of time and temperature have mean chromium contents of about 20 per cent plus or minus 3 per cent.

Experiments with hydrogen, nitrogen and various mixtures as carrier gas showed that chromizing was little affected by variation of carrier gas between 100 and 67 per cent of hydrogen, except that the nitrogen-containing mixtures generally gave more even coatings which may have been due to the better mixing of the heavy chromous chloride vapor with a heavier carrier gas. For rapid chromizing and for coatings of the highest chromium content, where dimensional or weight changes are not important, it is desirable to use an environment that is reducing and in which the chromous chloride activity is high.

Salt Bath Chromizing

Studies conducted at Battelle Memorial Institute for the Air Material Command and recently reported in "Journal of The Electrochemical Society" have shown that a variety of ferrous materials can be satisfactorily chromized at temperatures from 1652 to 2192 deg. F. by immersion in fused salt baths containing from 5 to 30 weight per cent chromous chloride. The primary salt bath composition used in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the Battelle tests consisted of the following mixture: 30 per cent chromous chloride; 49 per cent barium chloride; 21 per cent sodium chloride; sufficient chromium flake to cover the crucible bottom. The chromous chloride may be prepared by the reduction of chromic chloride with chromium metal.

Figure 6 shows the effect of time and temperature on the thickness of the chromium-alloy case produced on Armco iron by the salt bath method Cast iron was found to chromize without difficulty, a uniform, corrosion resistant, 0.025 mm. case being formed in three hours at 1890 deg. F. (Fig. 7). The chromium alloy coatings were tested by immersion in a 1:2 concentrated nitric acid, water solution at room temperature. Specimens having continuous chromium-alloy coatings were unaffected in a three to four month test period. Continuous coatings as thin as 0.005 mm. were reported to be resistant to this nitric acid test with several months duration.

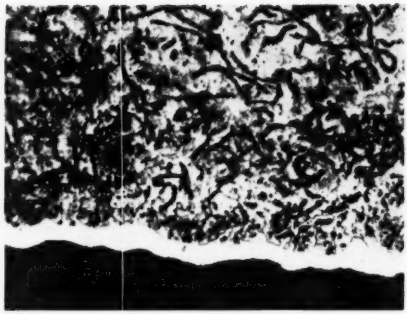

Fig. 7—Chromium alloy coating produced on cast iron by salt-bath chromizing for 3 hours at 1035 deg. C. (1900 deg. F.). Thickness of alloy coating: 0.0009 inch. Picral etch X50. *(Illustration courtesy Electrochemical Society, New York N. Y.)*

Interest in the chromium-alloy coating process arises in part from the known resistance of chromium and chromium containing alloys to corrosion under oxidizing conditions. The maximum temperature for stability in air, for example, increases from about 932 deg. F. for iron to about 1652 deg. F. for chromium and up to 1924-2012 deg. F. for a 25-30 per cent chromium steel. Since the surface of a corrosion resistant alloy is effective in preventing destructive action, there are undoubtedly many instances in which ordinary iron or steel having a protective, high chromium alloy coating on the surface would be as satisfactory from a performance standpoint as a continuous stainless steel structure. Recognition of this fact has led to interest in the various processes for producing a chromium-alloy surface coating by heating parts in contact with chromium metal (pack process) or in an atmosphere containing a chromium halide.

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NEWS of the Industry

COMPANIES

Lewis & Company, Louisville, Ky., has been appointed a distributor for **METALS DISINTEGRATING COMPANY, INC.**, Elizabethtown, N. J. It will handle MD aluminum pastes and powders and MD gold bronze powders in the Louisville area.

Representatives of the Metal Cleaner Department of **COWLES CHEMICAL COMPANY** participated in the annual sales conference recently held in Cleveland. Instruction and discussion sessions were held on Cowles Metal Cleaners, company sales efforts, and new product development to give the metal working industry up to date service for better cleaning quality and economy.

Jerry Alter, has established **THE BRUCAR EQUIPMENT AND SUPPLY CO.**, Box 433, Hemstead, N. Y., to furnish new and rebuilt equipment and supplies for the metal finishing industry. Mr. Alter formerly was sales manager for Pesco Plating Supply Company and has been engaged in supplying equipment to manufacturing and jobbing platers and polishers for more than seven years.

The L. H. Butcher Company, distributor of **ENTHONE, INC.**, metal finishing chemicals and processes since 1943, recently was granted an exclusive license to manufacture products in Los Angeles to serve eight western states and British Columbia. Laboratory facilities and personnel have been provided by Butcher to facilitate the study and application of Enthone products to the problems of area industries.

Left to right, first row: C. C. Bassett, Clarence Ozar, C. W. MacMullen, Earl Clark, R. F. Huntley; second row: Gene Brost, Bob Campbell, Bob Aufderheide, Clyde Lowe, Don Weaver, Jack Dobson, Fred Hitchcock; third row: George Woleben, Gene Garman, Carl Clabaugh, Charles Churchill and Elmer Lord.

The Butcher organization, basic industrial suppliers of chemicals, will distribute Enthone products throughout Washington, Oregon, Idaho, California, Nevada, Utah, Arizona, and New Mexico through its home office in Los Angeles and its branch offices in Seattle, Portland, San Francisco, and Salt Lake City.

THE DU-LITE CHEMICAL CORPORATION has completed transfer of all operations to its new plant on River Road, Middletown, Conn. According to Kenneth J. Dooley, president, the move was necessitated by the increasing demand for metal finishing and blackening chemicals and enlarged production on several Du-Lite products.

The new quarters include 8,500 sq. ft. of production area, ample laboratory and quality control space, and modern offices.

Speer Carbon Co., Saint Marys, Pa., and its subsidiaries, Jeffers Electronics, Inc., DuBois Pa., International Graphite and Electrode Corp., Niagara Falls, N. Y., and Speer Register Corp., Saint Marys, have consolidated into one company, the **SPEER CARBON COMPANY**, with headquarters at Saint Marys. The various subsidiaries will operate as divisions of the company.

NEW POSITIONS

GEORGE GORRA has joined the technical staff of The Chemical Coatings Corp., Rocky Hill, Conn. He will be engaged primarily in development work on flexible coatings for which his experience in the field of vinyl coatings and film production provides an excellent background.

Mr. Gorra is a graduate of Rensselaer Polytechnic Institute and was formerly associated with The Plastic Film Corporation and Milprint, Incorporated.

Retirement of **WILLIAM T. UTLEY**, divisional director of the Ditzler Color Division, Pittsburgh Plate Glass Co., has been announced by E. D. Peck, vice president. **HAROLD H. HILL**, industrial relations manager for Ditzler since 1947, succeeds Mr. Utley as divisional director.

William T. Utley (left), Harold H. Hill

Mr. Utley has been associated with Ditzler since 1913. He was treasurer and vice president of Ditzler Color Company until 1928 when the firm became a division of Pittsburgh Plate. He then served as assistant divisional director until nine years ago when he became director.

Mr. Hill joined Ditzler's traffic department during 1935 and has held successive positions of traffic, warehouse, personnel and industrial relations manager prior to his present appointment.

W. P. INNES, has been appointed technical director of MacDermid Incorporated, Waterbury, Conn. He was formerly employed in the research laboratories division, electrochemistry department, General Motors Corporation.

W. P. Innes

A graduate of the Michigan College of Mining and Technology, Mr. Innes is a captain in the Voluntary Army Reserve Corps and a member of the American Electroplaters' Society and the Electrochemical Society.

Bede Industrial Products, Inc., Cleveland 9, Ohio, has announced the appoint-

ment of **JOSEPH A. SANCHES** as New York area district sales manager. A new office has been opened at 475 Fifth Avenue, New York.

Formerly a service representative for Bede Industrial Products, Inc., Mr. Sanches has had many years of practical experience as department manager for several large companies in the finishing field. He has been a consultant and also is the author of many technical articles on finishing problems.

LOUIS K. BUELL, formerly in charge of enamel development, has rejoined the American-Marietta Company as chief chemist in charge of research and development in the new Coatings Division.

Louis K. Buell

A completely equipped laboratory for Mr. Buell and his staff, including ovens, coating machines, and physical testing equipment, is being set up in Kankakee, Illinois. Particular attention will be directed toward the improvement of steel pre-coating finishes for application to new products.

GEORGE HARTTER and **JOHN UPHOFF,** American-Marietta chemists, will assist in the development work.

The research department of Sharples Chemicals, Inc., will be integrated some time this summer with the research and development division of the parent company, the Pennsylvania Salt Manufacturing Co., Philadelphia, according to Dr. W. A. LaLande, Jr., manager of the Pennsalt division. The Whitemarsh Research Laboratories are being extended to provide for the addition of Sharples personnel and to increase Pennsalt's facilities.

Several organizational changes have been announced. **DR. JOHN F. GALL,** currently supervisor of research, will become director of the inorganic research department. **DR. JOHN F. OLIN,** director of research for Sharples, will be director of the organic research department, with **DR. GEORGE McCOY,** at present Pennsalt's organic group leader, as technical assistant director, and **T. E. DEGER,** Sharples assistant research director, as administrative assistant director.

WILLIAM M. LEE and **FORD R. LOWDERMILK,** supervisors of the product development and process engineering departments, will become directors of those departments. The analytical section will be given department status with **DR. PAUL A. MUNTER** as supervisor.

DR. CHARLES E. INMAN and **F. E. LAWLOR** will be advanced to group leaders in the organic research department, and the present group leaders in the Sharples research departments will continue as leaders in the organic research department.

CHARLES C. SIGMIER, chairman of the board of The Parker Appliance Company, has been appointed to the board of directors of The Osborn Manufacturing Company, Cleveland, according to Norman F. Smith, Osborn president.

Charles C. Sigmier

Mr. Sigmier started in the banking business after graduation from high school in 1915. In 1951 he resigned as vice president of The Cleveland Trust Company to become chairman of the board of The Parker Appliance Company. Mr. Sigmier is also a director of The Youngstown Steel Car Corporation and Samuel Moore & Company.

RICHARD C. WOOD has been appointed assistant to Abbott K. Hamilton, vice president in charge of product divisions of Commercial Solvents Corp., New York City.

Mr. Wood has held executive and development positions in the chemicals industry, and was previously with General Aniline and Film Corporation. A graduate of the University of Rhode Island and New York University, he is a member of the Chemists Club and the Commercial Chemical Development Association.

JOHN E. HAWLEY has joined the Pennsylvania Salt Manufacturing Company's Research and Development Division at the Whitemarsh Research Laboratories, Wyndmoor, Pennsylvania.

Previously on the Engineer of Tests staff of the Baltimore and Ohio Railroad, Mr. Hawley's new duties in the Maintenance Chemicals Department of Pennsalt will involve the development of cleaning compounds for the transportation industry.

Announcement has been made by Milford H. Corbin, president of Standard-Toch Chemicals, Inc., of the appointment of **JOHN OSTOCK** as manager of laboratories of the Eastern Division and **R. G. GOHMAN** as manager of laboratories of the Western Division.

Mr. Ostock is a graduate of Polytechnic Institute, Brooklyn, N. Y., where he received his B.S. degree, and is a member of the American Chemical Society and the New York Paint Production Club. He has been associated with the organization for many years.

Mr. Gohman received his B.S. degree at Wabash College, Crawfordsville, Ind., and is a member of the American Chemical Society. His activities in the industry and with the organization extend over many years. He is responsible for many technical improvements in the application of paint and lacquer. His contribution in the field of research and development involving coatings for product finishing has been marked by many outstanding achievements.

The Chemical Coatings Corporation of Rocky Hill, Connecticut, has announced the appointment of **STUART W. HOPKINS** as sales representative in central New York State. After graduating from Amherst, Mr. Hopkins took an intensive course in the company's research and development laboratories on industrial finishes.

Miss Beatrice Caniglia is shown receiving a complete set of Mathello's "Protective and Decorative Coatings," her award for the best average and attendance during the course, "Selected Subjects in Paint Technology," given in the evening division at St. Joseph's College, Philadelphia, Pa., during the school year 1951-1952. The course was sponsored by the Philadelphia Paint, Varnish and Lacquer Association and the Philadelphia Federation of Paint and Varnish Production Clubs. Also shown, from the left: Thomas Shannon, administrative assistant to the president, St. Joseph's College; George P. Woodward, chairman of the joint technical education committee of the two associations; Fred Greenawalt, Nuodex Products Corporation, who presented the award; and Dr. Willard Madson, who conducted the course.

ALMO D. SQUITERO has been appointed chief chemist of Hanson-Van Winkle-Munning Co., Matawan, N. J. He succeeds **DR. D. GARDNER FOULKE**, recently appointed executive secretary of the American Electroplaters' Society.

Almo D. Squitero

In his new position, Mr. Squitero will take over laboratory administrative duties and will supervise research and development in the field of periodic reverse plating, graphic arts plating, light-metal processing and other H-VW-M processes. He joined the company as electrochemist in 1950, having had broad experience in the electroforming and graphic arts plating fields.

JAMES V. WINKLER has been appointed head of the magnesium sales department's technical service and development group of the Dow Chemical Co., Midland, Mich., according to W. S. Loose, magnesium department sales manager. In his new position Mr. Winkler will be responsible for the development of further applications for magnesium.

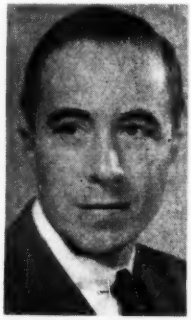
R. E. PERRY, former superintendent of magnesium extrusion, will also join the technical service and development group. **C. S. HARRIS**, chief engineer of the magnesium department, will assume management of the extrusion plant.

R. D. SWEET, formerly of magnesium wrought product sales, has joined the sales staff of Dow's Los Angeles office.

ARNO L. ZINKE has been elected president and a member of the board of directors of Mid-States Gummed Paper Company, a wholly owned subsidiary of Minnesota Mining and Manufacturing Co., St. Paul Minn. Mr. Zinke succeeds the late Irving R. McHenry.

Also elected to the board was **LOUIS F. WEYAND**, executive vice president and director of 3M.

Appointment of **JAMES H. HEROY, JR.**, as general manager of Pittsburgh Plate Glass Company's brush division has been announced by E. D. Peck, vice president in charge of the paint and brush divisions.



James H. Heroy Jr.

Mr. Heroy has been associated with the firm's brush operations since 1946 and has served as assistant general manager during the past two years. He is a graduate of Choate Preparatory School and Yale University.

ROBERT J. HUBER has become president and general manager of the Michigan Chrome and Chemical Co., Detroit, Mich. He succeeds his father, the late Phil Huber.

Mr. Huber has been vice president and general manager of the corporation since 1950. A graduate of the Sheffield Scientific School of Yale University, he joined the company in 1946.

F. C. BOYCE has been re-elected president of the D. J. Murray Manufacturing Co., of Wausau, Wisconsin, for the 20th consecutive time.

Other officers re-elected are **M. P. McCULLOUGH** and **D. C. EVEREST**, vice-presidents; **A. W. PLIER**, executive vice-

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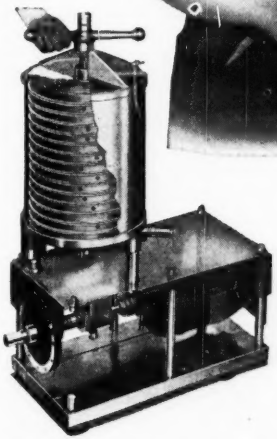

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president and general manager; **G. L. RUDER**, treasurer; **W. A. MARQUARDT**, secretary; and **C. L. DURKEE**, vice-president and sales manager.

DR. PAUL D. MERICA, executive vice president and a director, was recently elected president of The International Nickel Company of Canada, Ltd., and the company's United States subsidiary, International Nickel Company, Inc. **DR. JOHN F. THOMPSON**, retiring president, will continue as chairman of the board of directors.

R. LESLIE BEATTIE, vice president and general manager of the company's Canadian operations, has been elected a member of the executive committee of the board and a director of the United States subsidiary. **H. C. F. MOCKRIDGE** was also elected to the board's executive committee.

J. R. GORDON, assistant vice president, has been appointed to the further post of assistant general manager, and in these capacities will manage all activities in the Canadian operations under the direction of Mr. Beattie. **RALPH D. PARKER**, assistant vice president, has been elected vice president and a director of the company's subsidiary, Canadian Nickel Company, Ltd.

WILLIAM F. KENNEDY has become secretary of the company, succeeding **HENRY S. WINGATE** who will devote his full time as vice president and a director.

In addition, the following executive changes have been announced for the United States subsidiary: **WALTER G. KERRIGAN**, vice president, has been elected to the newly created position of vice president and general sales manager, responsible for both nickel and mill products sales, with **L. R. LAWSON** elected assistant vice president and assistant general sales manager; **THEODORE H. DAUCHY, RICHARD A. CABELL** and **JOHN A. MARSH** have also been promoted to assistant vice presidents.

NORMAN S. CASSEL has been elected a vice president of Interchemical Corporation. He will be concerned with research and development activities and will direct the Research Laboratories in New York City.

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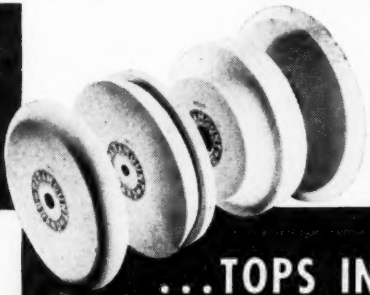

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Mr. Cassel joined Interchemical's Textile Colors Division in 1937 as vice president in charge of research. He became divisional president in 1947 and was elected a director of the corporation in 1951.

He succeeds **DR. A. E. GESSLER**, organizer and director of Interchemical's Research Laboratories. Dr. Gessler becomes emeritus director of research and will continue as a full-time consultant on research problems.

WILLIAM J. ROTHEMICH succeeds Mr. Cassel as divisional president of Interchemical's Textile Colors Division, relinquishing his title as vice president of the corporation in order to assume his new responsibilities.

Hercules Powder Company, Wilmington, Del., has announced the appointment of **CHARLES A. GRANT** as Chicago district sales manager for the cellulose products department. Mr. Grant, who has been technical sales service representative in the Chicago area since 1947, succeeds **EMMETT E. HIXON**, who will become service superintendent at the company's plant at Parlin, New Jersey.

Mr. Grant joined Hercules in 1942 shortly after graduation from Duke University. He is active in the program of the Chicago chapter of the National Paint, Varnish and Lacquer Association.

ROBERT A. RULEFF has been appointed western sales manager of Bart-Messing Corp., Bellville, N. J. He will be located in Dayton, Ohio, and will cover the midwestern states.

Robert A. Ruleff

Mr. Ruleff was graduated from the University of Pennsylvania in 1942 and since that time has been associated with Westinghouse Electric Corporation, Pittsburgh, and George A. Stutz Manufacturing Co., Chicago. He is a registered professional engineer in the State of Ohio and a member of the American Electroplaters' Society.

Appointment of **DR. CHARLES W. WALTON** as general manager of the adhesives and coatings division of Minnesota Mining & Manufacturing Company, to succeed **LOUIS F. WEYAND**, has been announced by R. P. Carlton, president. Mr. Weyand recently was made executive vice president in charge of all 3M tape operations.

Mr. Walton received his doctorate in physical and colloid chemistry from the University of Michigan in 1933. In 1947 he joined Minnesota Mining as assistant to Mr. Carlton, and in 1948 he organized and became general manager of the company's new products division.

Mr. Weyand has announced the promotion of **ALAN H. REDPATH** to the newly created position of merchandising manager of all 3M tape products, and the appointment of **R. S. FROMMER** as manager of the tape group's central sales inventory and production planning department.

Mr. Redpath, a veteran of 21 years' service with 3M, had been merchandising manager for cellophane tape and ribbons since 1949. Mr. Frommer started with the company in 1937 as a technician in the abrasive division.

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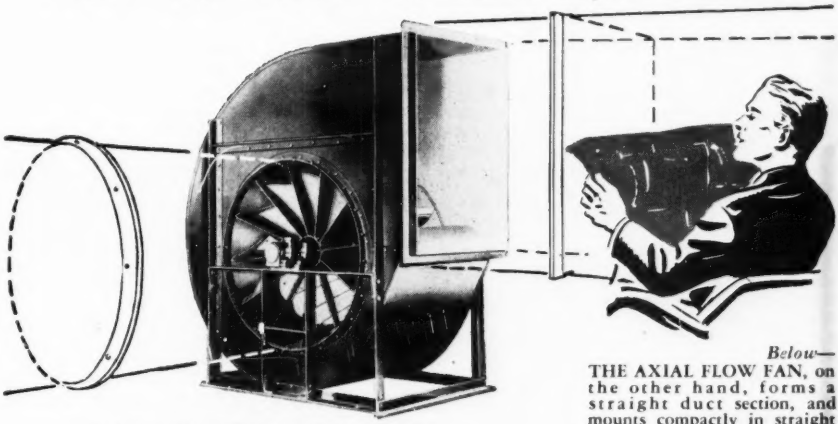

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THE AXIAL FLOW FAN, on the other hand, forms a straight duct section, and mounts compactly in straight piping. For complete information on "Buffalo" Axial Flow Fans, write for Bulletin 3533-C

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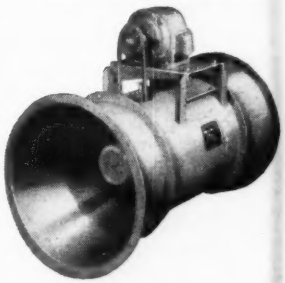
Since air leaves the centrifugal fan in a direction perpendicular to that of the entering air, the logical location of the fan is where a 90° turn in the duct is planned. This takes advantage of the natural right-angle change in direction of the air and does not sacrifice efficiency, as in forcing air through an ordinary elbow. "Buffalo" Limit-Load centrifugal fans like the one shown above have features for additional efficiency and quiet, such as double backward curve blades, directional inlet vanes, specially shaped housing and dynamically balanced wheels. Medium speed fans, they are ideal for handling large volumes of air at medium pressures. They have the additional advantage of being non-overloading, regardless of system pressure. For complete information, write for Bulletin 3737.



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ROBERT F. HUNTLEY has been elected president of Cowles Chemical Company, Cleveland, to succeed **EDWIN COWLES.** Mr. Cowles will continue as a director.

Mr. Huntley joined Cowles in 1942 as assistant to the president. Later that year he was elected to the board of directors and appointed vice president and general manager. While serving as president, he will also continue in the duties of general manager.

In addition to Mr. Cowles and Mr. Huntley, **C. C. BASSETT** and **C. B. LANSING** were reelected to the board of directors. **DAVID A. GASKILL** is a new member of the board, elected to succeed **E. S. BASSETT** who is retiring.

J. T. CATALDO has been appointed assistant general manager of the International Rectifier Corp., El Segundo, Calif. He attended Clarkson College of Technology, Brooklyn Polytechnic Institute, and Rutgers University.

Mr. Cataldo is a member of the IRE and has been serving as a member of the AIEE Metallic Rectifier Committee. He has contributed many articles to engineering, radio, and electronic periodicals and has presented a number of papers on the theory and application of selenium rectifiers.

Michigan Oven Co., Detroit, Mich., has appointed **H. O. BENNETT** as its representative in the Indianapolis area and for parts of Ohio and Kentucky, and **BRUCE HOGARTH** as its representative for the Philadelphia area.

Mr. Bennett, a graduate of Purdue University, was employed for five years as process engineer for General Motors and for fourteen years as an industrial representative for the Surface Combustion Corporation. Mr. Hogarth was associated with W. Wirt Young and Associates as a sales engineer following his graduation from Duke University.

FREDERICK G. HOPPE has been named manager of the Metal Finishing Division of the Pyrene Manufacturing Co., Newark, N. J., according to L. E. Eckelmann, vice president.

Mr. Hoppe was superintendent of the

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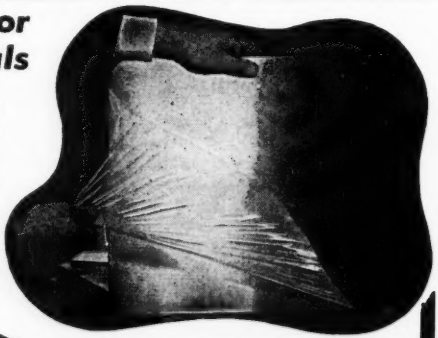

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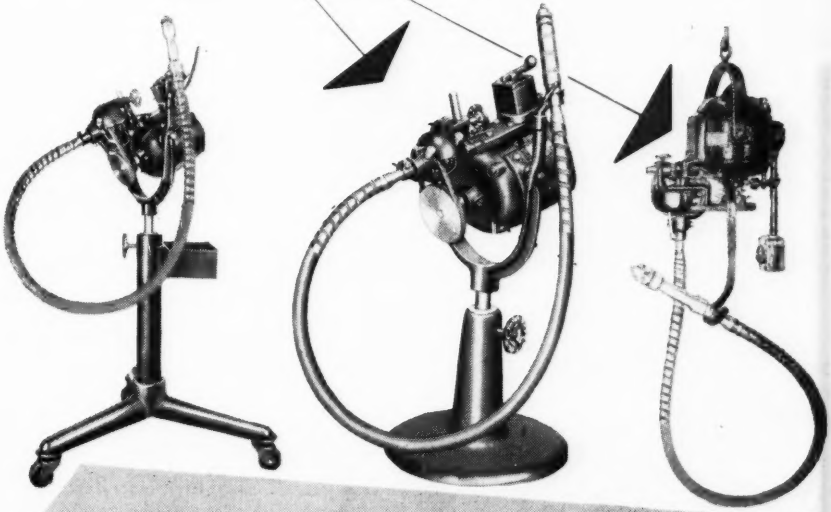

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National Chromium Corporation before he joined Pyrene in 1932. He is well known throughout the metal finishing field and especially as a pioneer in making practical applications of chrome plating. He is co-author, with Benjamin Freeman, of the text book "Electroplating With Chromium, Copper and Nickel."

MYRON CERESA has been appointed manager of electroplating projects for the Special Products Development Division of the Westinghouse Electric Corporation. He will be in charge of laboratory operations, including development, pilot plant and technical service work.

Mr. Ceresa joined Westinghouse in 1937 following his graduation from the Pennsylvania State College. He was an engineer at the research laboratories until 1941, when he transferred to the materials engineering department in East Pittsburgh. He joined the electroplating projects section in 1947.

The Manufacturers Processing Company, Detroit, has announced the appointment of **DAVID E. PEACOCK as a** sales engineer to cover the western half of the lower peninsula of Michigan. He will promote sales, supervise equipment installation and exercise control over solvent warehouses in that area.

Mr. Peacock was formerly sales manager for the Continental Decalcomania Company and prior to that was a sales engineer for Detrex Corporation.

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JAMES C. GRINDEY has been appointed to the Chicago sales staff of Metals Disintegrating Company, Inc., Elizabeth, N. J., manufacturers of metal pigments, metal powders, and metal abrasives.

Mr. Grindey was formerly with Adams & Elting Company, Glidden Company subsidiary, and most recently was president and treasurer of Oroline Products Co., Chicago, Illinois.

James C. Grindey

Octagon Process, Inc., manufacturer of metal finishing and metal cleaning compounds, Staten Island, N. Y., has announced the appointment of **PAUL MEZICK** as district sales manager for the State of Pennsylvania.

Mr. Mezick was formerly industrial specialist of the procurement division of the Philadelphia Ordnance District. He is a member of the Engineers Club, the Army Ordnance Association, and the Philadelphia Chemical Club.

One sales and two engineering appointments were announced recently by Hooker Electrochemical Company, Niagara Falls, New York.

DR. EUGENE T. MILLER and **ALFRED W. TOON** have been appointed to the engineering department. Dr. Miller, a 1942 graduate, was a supervisor of research at the Hungarian American Oil Company, and later held a similar position at Mercedes Benz followed by work for the U. S. Forces in Germany. In this

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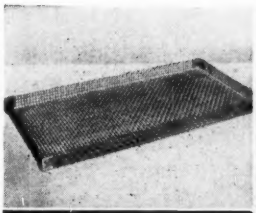
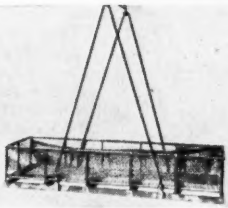
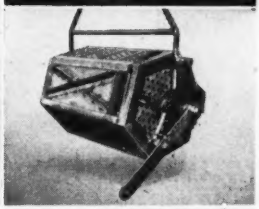
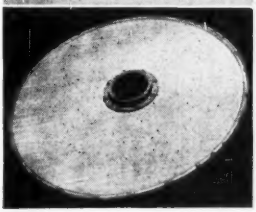
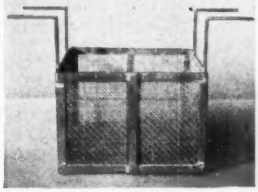








heat treating?
pickling?
plating?
filtering?
handling?



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country he has been associated with Calco, The Lummus Company, and National Aniline.

Mr. Toon has much experience as a draftsman, maintenance engineer, structural engineer, and plant engineer.

HERBERT K. HOLDEN has been appointed salesman in the Niagara sales territory which comprises western Pennsylvania and New York State exclusive of the metropolitan area.

EDWARD J. GIRK has been appointed president of the Torit Manufacturing Co., St. Paul, Minn., manufacturers of cabinet and cyclone type dust collectors for industrial use. Mr. Girk has been vice president in charge of sales and advertising for many years. He succeeds **ARTHUR E. SWANSON** who becomes chairman of the board.

L. F. KOERING has been appointed vice president and **G. A. HUNA** has been reelected secretary of the company.

Metal & Thermit Corporation, New York, has announced the appointment of **HERBERT E. HIRSCHLAND** as director of research. A graduate of Dartmouth College and of Massachusetts Institute of Technology, he joined the company's research laboratory staff in Rahway, N. J., in 1941. In 1946 he became a sales engineer in the chemical sales division and since 1950 has been assistant sales manager of that division.

The Hanson-Van Winkle Munning Co., Matawan, N. J., has announced the appointment of **JOHN H. GORMAN** as field electrochemist in the Michigan-Ohio territory. He will make his headquarters at the company's Detroit office.

Mr. Gorman joined the H-VW-M organization as electrochemist in 1951 after a number of years of metallurgical and electroplating experience in field service capacities.

The DuPont Company's Finishes Division has announced the appointments of **HENRY E. DRUCE** as industrial sales representative in Tennessee, and of **V. H. MEATHERINGHAM** as industrial sales representative in Alabama, northwest Florida, Mississippi, and eastern Louisiana.

Mr. Druce will make his headquarters in Chattanooga. A graduate of Drexel Institute, Philadelphia, he has had three years' production experience in DuPont plants and worked in the finishes laboratory for ten years. Most recently he has been on the staff of the industrial sales manager in Wilmington.

Mr. Meatheringham will have his headquarters in Birmingham, Ala. He has been associated with the company's industrial finishes division for 24 years.

E. M. KLINE became general manager of the Huntington, W. Va., Works of the International Nickel Company, Inc., on July 1. He succeeded **HERMAN M. BROWN** who retired from full time work. **G. K. CROSBY** has been appointed assistant general manager of the Huntington Works, succeeding Mr. Kline in that position.

A graduate of Pennsylvania State College, Mr. Kline joined International Nickel in 1923 as assistant chief chemist at Huntington. He became chief chemist in 1926, works technical director in 1939, and assistant general manager in 1947.

Mr. Crosby, a graduate of Massachusetts Institute of Technology, joined International Nickel in 1936 as a metallur-

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WM. A. JUERGENS CO. Write for Sample 4036 LAGRANGE ST. TOLEDO, OHIO

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direct motor drive

TILTING TUMBLING BARRELS

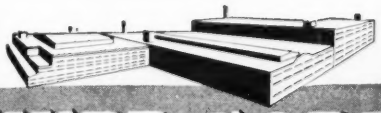
Available in Kiln-Dried Maple or Steel Shells

FINER FINISHES AT LOWEST COST. Today Globe Tumbling Barrels assure you increased production and finer, more economical finishes. Globe's exclusive work-shifting bottom gives six-way motion for greatest parts agitation to save finishing time and to give uniformly finer finishes to your parts. Low speeds for non-ferrous metals and plastics assure quality finishes with less spoilage.

Globe's direct motor drive is a space-saver for your shop, and its compact, rugged construction means years of dependable service.

FREE EXPERIMENTAL SERVICE

Like to cut finishing costs? Hupp's experimental laboratory will analyze your product finishing needs and make cost-saving recommendations. Send samples of your parts to be processed and a finished part. No charge or obligation. Write today!



Hupp Manufactures A Complete Line Of
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HUPP CORPORATION

GLOBE STAMPING DIVISION

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SERVING INDUSTRY SINCE 1902

gist. He successively became combustion engineer, assistant to the general manager, superintendent of production, and general superintendent.

The Norton Company, Worcester, Mass., has announced several personnel changes in its sales and research activities.

ROBERT CUSHMAN has been appointed Pacific Coast district manager with headquarters in Los Angeles. He replaces **LUCIEN GAY** who retired on July 1, after 36 years with Norton.

DONALD F. JONES has been appointed abrasive engineer, and will take over Mr. Cushman's central New York area. **KENNETH F. EBBESON,** formerly grinding engineer, has been appointed field engineer in the northeastern district .

HARRY G. BRUSTLIN, abrasive engineer in the Rocky Mountain area has been transferred to the Pacific Coast District. **GORDON S. BRANDES** has been appointed abrasive engineer in the territory vacated by Mr. Brustlin.

H. PAUL OTTO, who has been supervistor of the Worstecer sales office, will replace **CARL W. ATWOOD** as district manager of the Hartford, Conn. territory. Mr. Atwood retired July 1, after 32 years with the company. **JOHN D. PUTNAM** has been appointed Worcester machine sales supervisor, succeeding Mr. Otto.

THOMAS M. THORNTON will become district sales engineer with headquarters in Detroit, Mich. **ALLEN C. MOORE** has been named field engineer for the Detroit area.

LORING F. COES, JR., research engineer, has been appointed assistant director of research and development in charge of the laboratory's organic section. Other appointments, which involve only change in title in line with the company's current program of streamlining its research activities, are:

ALBERT A. KLEIN becomes assistant director of research and development in charge of the microscopic, chemical, and physical research sections; **DR. LOWELL H. MILLIGAN** becomes assistant director of research and development, and **ARCHIBALD H. BULLARD** has been named associate director of research and development in charge of the Chippawa, Ontario, laboratories.

FORM-A-ROC

FIRST-COAT

FOUNDATION

FOR FINE FINISH

1. Dries with lacquer speed.
2. Has double lacquer solids at spray gun.
3. Fills very well—sands easily.
4. Adheres tenaciously to steel, wood, presdwood, aluminum, galvanized metal, etc.
5. Holds out lacquer, synthetic or oleoresinous enamels exceptionally well.
6. Thins 3:1 with xylol.
7. Available in GREY, SALMON and OFF-WHITE.
8. Ground well to smooth texture.

The Varnish Products Company

5208 Harvard Avenue Cleveland, Ohio

MEETINGS

A program developed for the practical enameler has been announced for the 1952 Shop Practice Forum of the **PORCELAIN ENAMEL INSTITUTE.** More than 300 enameling representatives are expected to attend the meetings on September 10, 11, and 12 at the University of Illinois, Urbana.

One of the opening day sessions will be devoted to late developments of general interest to the industry. Topics scheduled include "One Coat Whites Directly on Steel," "Fluorescent Enamels," "Stable Colors in Titania Opacified Enamels," and "Low Temperature Enamels."

"Enameling of Aluminum" will be discussed in its various aspects during the second day of meetings. Later that day, high temperature ceramic coatings will be considered and representatives of the armed forces are expected to describe the military need for ceramic coatings and to indicate possible post-war implications.

New uses for porcelain enamel and work on alkali-resistant porcelain enamels will be discussed. Representatives of key enameling companies will consider control practices used throughout the industry. A "Board of Experts" is scheduled to handle enameling problems presented by the group.

Make the HAMMER Test!

See why Super-Honite Chips last twice as long

Hit an ordinary synthetic chip with a hammer. See how it crumbles, pulverized by the force of the blow. Now, hit a piece of Super-Honite the same way. See how *it* fractures in cleanly-divided, large segments. Takes a *harder* blow! The hammer test shows how Super-Honite—the world's toughest abrasive chip—stands up better than any other barrel finishing abrasive. Eliminates lodging. And Super-Honite is the *only* chip engineered for both grinding and burnishing . . . the *only* chip you can rely upon for double duty, double life performance.

Make the hammer test and see the difference! See why Super-Honite never crumbles.

Regular Honite for toughest natural chip—No other natural barrel finishing abrasive—not even granite—retains its edge as long as regular Honite. Use it for close tolerance work or where a minimum of metal removal is required.

Write today for your free copy of "3M Barrel Finishing" . . . filled with helpful information on increased efficiency, lower costs. Address Minnesota Mining & Mfg. Co., Dept. PF-82, St. Paul 6, Minn.

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Made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N.Y. In Canada: London, Ont., Can.

SOCIETIES

Stanley McNeilly, treasurer of Bacon Felt Co., Taunton, Mass., recently was elected president of **THE FELT ASSOCIATION,** a group of the leading manufacturers, cutters and jobbers of wool felt. He has been active in the felt field since 1942.

Offices of the **PORCELAIN ENAMEL INSTITUTE** were moved on July 1 to the Dupont Circle Building, 1346 Connecticut Ave., Washington 6, D.C. John C. Oliver, secretary, in announcing the new location, said that the move was necessary because expansion of Institute activities in recent years had made the old quarters inadequate.

William H. Lutz, a member of the Federation of Paint and Varnish Production Clubs, has been elected to the board of directors of the **AMERICAN SOCIETY FOR TESTING MATERIALS** for a three-year term. Mr. Lutz is a past-president of the Western New York Club and has been active in Federation affairs for many years currently serving on the 1953 Joseph J. Mattiello Lecture Committee. He is employed as Technical Director of Pratt & Lambert, Inc., Buffalo, New York.

A new theory on blackening of metals developed by Lehigh University's Institute of Research and Enthone, Inc., New Haven, Conn., was reported at the recent meeting of the **AMERICAN ELECTROPLATERS' SOCIETY** at Chicago.

The paper, which was read by Dr. Walter R. Meyer, president of Enthone, was the product of combined research by Dr. Meyer, Dr. Earl J. Serfass, head of the University's chemistry department, and Dr. Ralph F. Muraca, assistant professor of chemistry.

The study was of a thermodynamic nature and explains the reactions in black nickel plating and sulfide blackening of other metals. Prior to now, the chemical mechanism of these processes was not known. The new theory makes possible the selection of chemicals and conditions for blackening of metals such as steel, stainless steel, zinc, and cadmium.

TRAINING COURSES

The fall schedule has been announced for the **SCHOOL OF SPRAY PAINTING** operated by the DeVilbiss Company, Toledo 1, Ohio. Now entering its 27th year of tuition-free operation, the program offers instruction in industrial spray finishing for users of DeVilbiss equipment, and is open to foremen, shop superintendents, maintenance supervisors, spray operators, and others.

Courses will be conducted during the weeks beginning September 8, October 6, November 17, and December 15. They will be held in the new school headquarters adjoining the company's main plant at Toledo.

Applications for all classes on the fall schedule should be made now. Those interested may request School Form INS-753-A.

meetings OF INTEREST TO FINISHERS

Sept. 8-12. 7th National Instrument Conference and Exhibit, Instrument Society of America, Cleveland, Ohio.

Sept. 10-12. 14th Annual Shop Practice Forum, Porcelain Enamel Institute, University of Illinois, Urbana, Illinois.

Oct. 22-24. 21st Annual Meeting, Porcelain Enamel Institute, Greenbrier Hotel, White Sulphur Springs, West Virginia.

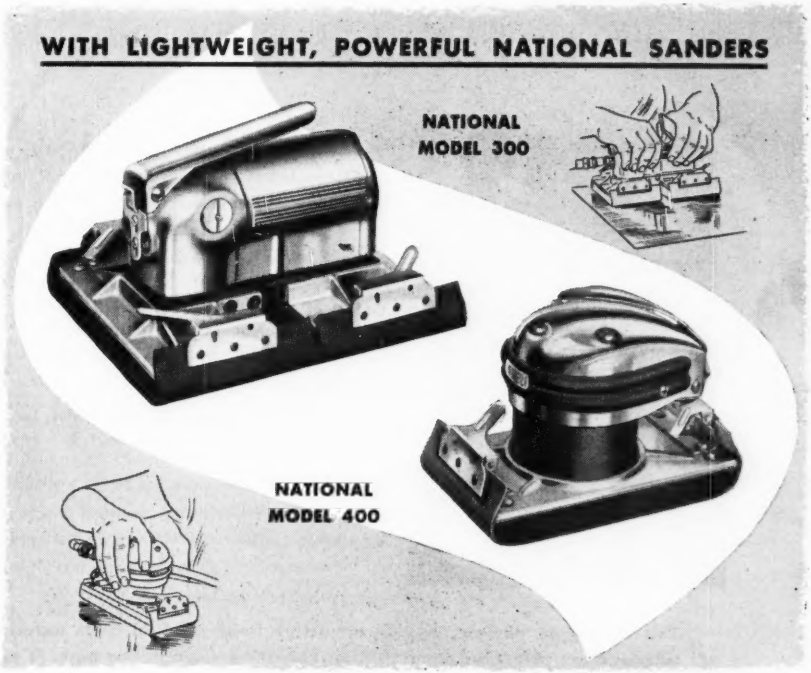
Nov. 17-19. 64th Annual Convention, National Paint, Varnish and Lacquer Association, Palmer House, Chicago, Ill.

Nov. 18-22. 17th Annual Paint Industries' Show, Palmer House, Chicago, Illinois.

Nov. 20-22. 30th Annual Meeting, Federation of Paint and Varnish Production Clubs, Palmer House, Chicago, Illinois.

High Production Sanding!

WITH LIGHTWEIGHT, POWERFUL NATIONAL SANDERS



CUT SANDING TIME AS MUCH AS 75%

These fast, compact, air driven block sanders are adaptable to many sanding operations previously possible only by hand sanding. Because they are easy to operate . . . vibrationless . . . and astonishingly fast, they can cut sanding time as much as 75%, and at the same time, give a better finish. See your distributor, or write for details.

• *Write for our New Sanding Catalog*

NATIONAL NS SANDERS

NATIONAL AIR SANDER, INC.

2820 AUBURN STREET, ROCKFORD, ILLINOIS

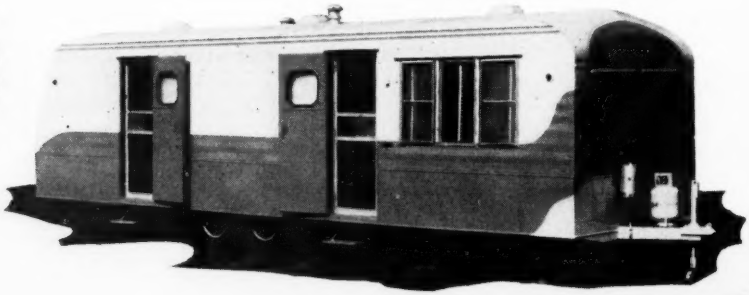
Finishes

This automatic Dual Drink Vender dispenses 1400 drinks in two flavors without refilling. Requiring only 24 by 30 inches floor space, it is finished in lustrous enamel with sparkling trim for eye-appeal.

(Photo courtesy Lyon Industries, Inc., New York 17, N. Y.)

This "Home on Wheels" has an attractive finish applied to its exterior skin of aluminum. After washing with an aluminum cleaner, the body is masked, primed with an acid etching primer and lightly sanded. Its finish is completed with the application of hot enamel.

(Photo courtesy Prairie Schooner, Inc., Elkhart, Ind.)



that aid in appearance and utility

These beautiful containers are made by printing on tinplate. With special impressions for each color used, the printing process is much like that used for color printing of paper. The tin plates are oven dried following printing and then stamped into various intricate shapes.

(Photo courtesy British Information Service, New York 20, N. Y.)

The Floating Air Self Service Meat and Dairy refrigerator is finished with two coats of porcelain enamel. Decorative aluminum strip is anodized; steel parts are zinc plated followed with a conversion coating, and copper parts tin plated. Back panels are phosphatized and painted with white primer.

(Photo courtesy Ed Friedrich Sales Corp., San Antonio 6, Tex.)

New • EQUIPMENT • MATERIALS • PROCESSES

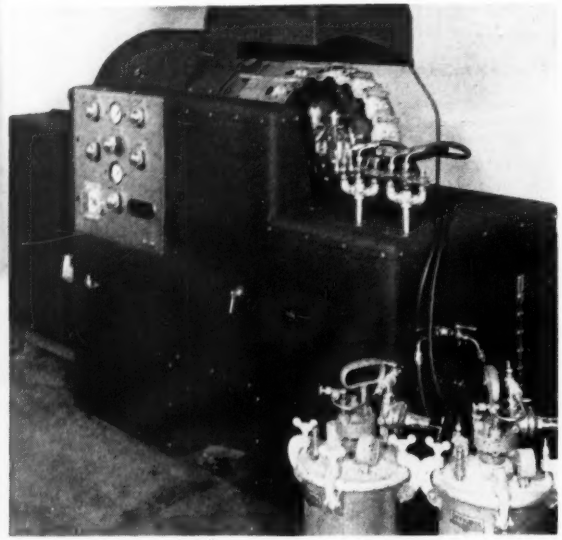
Automatic Spray Painting and Masking Machine

An automatic spray painting and masking machine has been developed and is now being manufactured by Finish Engineering Co., Inc., 1115 Cherry St., Erie, Pa. The machine paints up to four different colors in one loading and automatically washes spray masks.

Because of automatic mask washing, production can be maintained at a steady rate as fast as the operator can load, the manufacturer states. Production rates of more than 3000 pieces an hour have been achieved with less than a day's experience by the operator, it is claimed.

The machine uses an indexing mask carrier which is powered by an air motor. Mask washing is accomplished by a turbulent circulation of solvent using an impellor powered by an explosion-proof motor. Adjustment of speeds and pressures can be made by dials on a control panel conveniently located on the side of the machine.

The equipment is adaptable to a wide variety of moldings, castings, or stampings, and changing from one job to another is accomplished by slipping the masks out of each station and inserting those for the next job.



Automatic Spray Painting and Masking Machine

Fisher Titrimeter

An improved Titrimeter has been announced by Fisher Scientific Co., 717 Forbes St., Pittsburgh 19,

Fisher Titrimeter

Pa. This instrument, used for the quantitative determination of solutions, features a redesigned stand, improved stirrer and control box, integral provisions for microtitrations, and Karl Fischer moisture determinations.

The stand, a massive casting, firmly supports burettes and sample beaker so that they are close to the magnetic stirrer, electrodes and end-point indicator, and has a hood to protect connections from "hand capacity" effects.

Stirring speed can be set at any point from a gentle swirl to a brisk agitation and need not be reset during a titration series. The motor is mounted on a swivel head under the beaker and stirring magnet, and gives counter clockwise stirring. Preliminary blinking of the electronic eye signals the approach of an end point.

Provision has been made in the control box for polarized electrode systems such as those used in Karl Fischer determinations. A calibrated dial, graduated in pH units as well as in volts, and two controls are the only manipulative parts.

Neilco 921-T Cleaner

A specially compounded alkali surface cleaner for brass, bronze, copper, copper plated metal, and steel, has been developed by Nielco Laboratories, P.O. Box 4703, Detroit 19, Michigan.

It is claimed that Nielco 921-T, maintained at a temperature of 212 deg. F. and used at a concentration of 8 oz./gal., will effectively remove oxides from brass, bronze, and copper, smutt from cold rolled steel, and buffing compounds from copper plated metal and steel in times up to three minutes.

The cleaner was developed originally to remove scale and verdigris from old brass shell casings. It is said to brighten brass, bronze, and copper sufficiently to make a bright dip unnecessary.

Chromaster Plating Unit

A 250 ampere Chromaster unit has been added to the Ward Leonard Electric Co., Mount Vernon, N. Y., line of industrial

Chromaster Model A-250

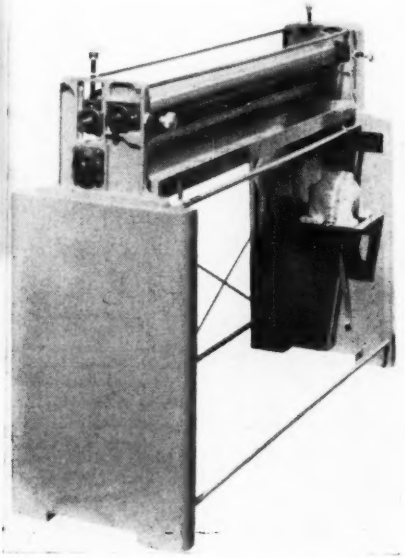
chrome plating equipment. The unit is designed for precision hard chrome plating directly on industrial steels, cast iron and most non-ferrous metals the manufacturer states.

The Chromaster A-250 was developed for plating small parts in large quantities or larger parts with areas up to 125 sq. in. Individually mounted plating tank and power unit permit flexibility in installation. The power unit contains a built-in selenium rectifier complete with instrument panel and controls for accurately regulating the rate of deposit.

Walco Coater

A heavy-duty coater adaptable to many industrial coating operations is being manufactured by L. R. Wallace & Co., 440 Seaton St., Los Angeles 13, Calif. The manufacturer states that the machine will coat any flat surface with lacquer, varnish, paint, adhesive, latex, or drawing oil.

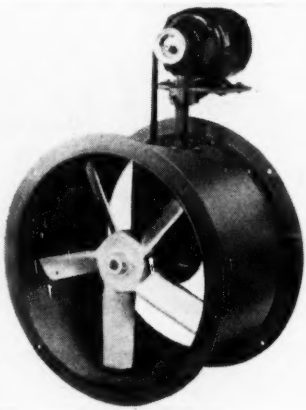
The unit will coat material up to 62 inches in width and 1½ inches in diameter at a speed to 3800 linear feet per hour. The coater is available in models C-1, single, and D-2, for coating one or two sides.



Walco Coater

Standard Type SP Fan

For exhausting hazardous or obnoxious fumes, dirt, heat, and smoke, as well as for other applications where it is desirable to have the motor outside the air stream, Standard Electric Manufacturing Co., Inc., West Berlin, N. J., has introduced a general purpose type fan incorporating a number of improvements. Explosionproof, enclosed or open-type motors are available with this rugged fan, which is said to meet UL specifications for spray booths.



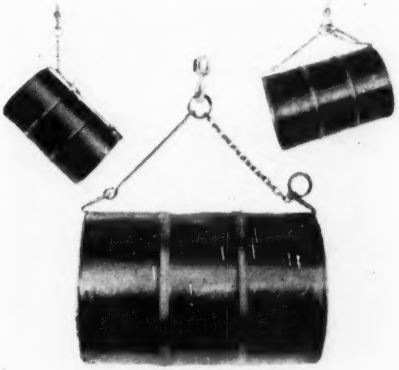
Standard Type SP Fan

Designated as the Type SP, the fan is available in various capacities up to 30,500 c.f.m. free delivery. Features include sealed SKF bearings; double-angle motor support; adjustable motor base for belt take-up; and heavy cast aluminum fan blade in a wide range of sizes from 18 to 42 inches. Motors from ¼ to 7½ h.p. are available as required.

Drum and Barrel Sling

Palmer-Shile Co., 12613 Mansfield, Detroit 27, Mich., has developed a sling of heavy welded chain and forged grab

hooks for loading and unloading trucks, for draining drums, and for general purpose handling. The sling, which weighs about 8½ pounds can handle any container with a lip, up to 1,000 pounds in weight. It can also pick up a container from a horizontal position and set it upright, the manufacturer states.



Palmer-Shile Sling

Speedylectric Steam-Jet Cleaner Model JC-50

Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass., has announced the availability of its Model JC-50, embodying the principle of Speedylectric steam-detergent cleaning, which operates at steam pressures up to 200 p. s. i. g. and rinse water pressures up to 400 p. s. i. g. The built-in Speedylectric Boiler Model 600-S3, Underwriters' Laboratories listed and ASME Code, provides steam for the cleaning operation and rinse water heating.

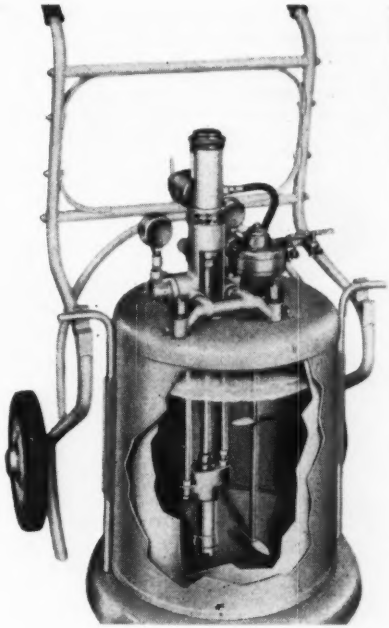
Featuring complete freedom from fire hazards, having no smoke stacks, flues, or flames, and maximum safety (no low water hazard, coils to burn out, or dangerous fuel tanks), the portable all-electric JC-50 provides steam-jet cleaning effectiveness with 200-pound pressure dry steam, detergent as needed, and velocity 400-pound pressure hot or cold water jets, all under finger-tip control of the operator.

The unit requires power availability of not less than 30 to 40 kw., 220, 440, or 550 volts, three phase, and water supply of 250 to 300 gallons per hour.

Portable Spray Gun Supply Pump

A portable heavy-duty Paintmaster spray gun supply pump that works directly from 5 or 10-gallon original containers has been announced by the Gray Co., Inc., 1012 Sibley St., Minneapolis 13, Minnesota.

The air-operated, double action reciprocating pump is designed for easy handling of paints and materials by plant maintenance departments. The pump can be used as a portable sprayer with the Sta-Level hand truck, and can be handled by one man. For stationary operation,



Graco Portable Heavy-Duty Paintmaster

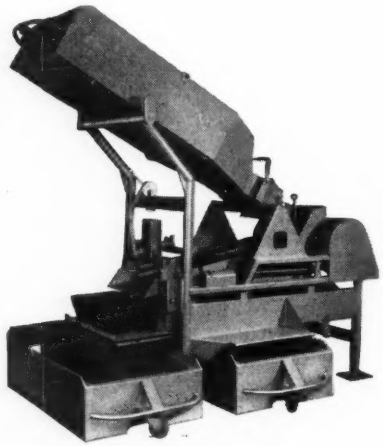
the truck disengages from the trunnion arms.

The separate air-operated, dual-bladed agitator keeps the materials mixed independent of paint pump operation. The blades of non-sparking aluminum, are adjustable to any depth. The manufacturer claims that since no air pressure is exerted on the material, aeration is reduced to a minimum.

Chip Separator and Grader

A separator for the effective removal of parts from deburring and finishing chips and for grading different sizes of chips is offered by The Grav-i-Flo Corp., 400 Norwood Ave., Sturgis, Mich. The new design of the machine is claimed to offer these improvements: greater compactness due to the location of the hopper at the top of the machine; floor space is cut by one-half; separation of parts is effected without any danger of impingement to the parts; and the two-deck carriage permits grading three sizes of chips at one time.

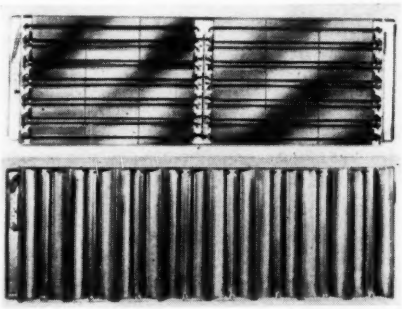
The inclined end of the screen carriage is motivated by an eccentric, while the lower end rests on ball bearing rollers. The machine is quickly converted to chip grading by the simple turn of a cam, which raises the lower end of the carriage off its rollers, and creates the same eccentric action as is performed at the back of the machine. The result is a uniform throw over the entire length of the two-deck screen carriage, permitting an accurate grading of chips. Screen sizes for various sizes of chips are available.



Grav-i-Flo Chip Separator and Grader

Radiant Heater Panels

A completely integrated radiant heating oven for industrial baking and drying at temperatures of 650 degrees F. or less has been developed by Jensen Specialties, Inc., 9331 Freeland Ave., Detroit 27, Mich. Utilizing 2000-watt General Electric Calrod* heaters, it is manufactured in a complete panel, including tubular heating elements, reflectors, and insulation, with plug-in, lock-in receptacles and pantograph mounting features.



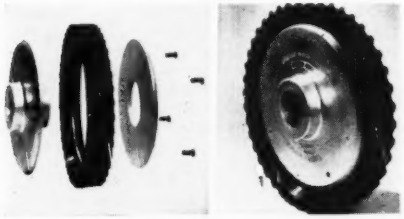
Radiant Heater Panels for Jensen Oven

The heater panels on the oven, designed to be freely interchangeable, enable Jensen to build units of any length, size, or rating, and to change ratings of finished ovens at will. The panels may be opened and serviced from outside the oven, thus enabling users to replace a heater element during operation in approximately one minute. Claimed to be non-fragile and having an average life in excess of 7,000 hours, the Calrod heaters attain full heat in 2½ minutes and cool in 50 seconds.

* Reg. Trade Mark

Abrasive Belt Contact Wheel

Behr-Manning Corp., Troy, N. Y., has developed an abrasive belt contact wheel, known as the "Rubber-Rim," which is constructed from two basic members; namely, a steel rim onto which rubber in durometers from 10 to 90 has been molded and a set of flanges which contain the rubber rim. Light in weight, the wheel is



Rubber Rim Abrasive Belt Contact Wheel developed by Behr-Manning Corp. and the Chicago Rubber Co.

designed to afford a long, economical service life because the rubber face can be readily replaced with a new rubber rim should it be damaged or worn out.

Available in a "cog-tooth" as well as 45-degree serrated and straight face design, the Behr-Manning Rubber-Rim Wheel is made in 14 and 16-inch diameters. Two models of the wheel are offered, one model being manufactured by Divine Brothers, Utica, N. Y.

With the other model, made by the Chicago Rubber Company, 2620 N. Claybourne Ave., Chicago 14, Ill., the wheel can be separated by loosening four Allen set screws which hold the tire between two aluminum flanges. This feature permits the user to interchange various wheel widths by having a set of flanges and rubber rims of various widths. Tires are available in standard face widths of one to six inches.

Forcite Anode Basket

A Forcite Anode Basket which permits the use of anode materials completely has been announced by R. O. Hull & Company, Inc., 1308 Parsons Ct., Rocky River 16, Ohio.

According to the manufacturer, the Forcite Anode Basket is expressly designed for efficient, complete solution of scrap or ball anode material and may be used in nickel, copper, lead, and all cyanide baths. Fabricated from reinforced steel, the basket is coated with an inert, insulating material.

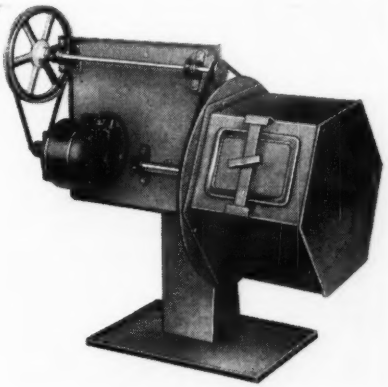
It is stated that the tapered construction of the basket is ideally suited to give continuous electrical contact to the anode mass without requiring replacement of "contact" anodes. Contact is made by shielded, inert graphite blades which extend the entire depth of the basket and are coupled to the anode bars. Forcite Anode Baskets are available in 24 and 30 inch lengths, and special lengths may be ordered.

Rampe Barrel Finishing Machine

Rampe Manufacturing Co., 3320 St. Clair Ave., Cleveland 14, Ohio, has added a barrel finishing machine to its line of Tumbler-Mixers.

This model, TMK, has a hexagonal steel burring barrel of 200 pound capacity which is turned at 33 r.p.m. by a ¼ h.p., 110 volt A.C. single phase motor. It is intended for production finishing of small parts or small lots of large parts.

Features include anti-friction bearings throughout, automatic slack take-up,

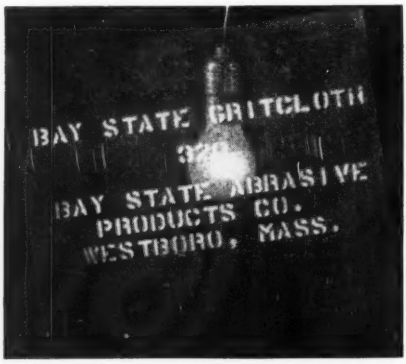


Rampe Barrel Finishing Machine

and barrels unlined or lined with oil and chemical resistant vinyl plastic. The machine is 33 inches high and weighs 130 pounds. It requires 36 by 19 inches of floor space.

Bay State Sanding Fabric

Bay State Abrasive Products Co., Westboro, Mass., has announced the development of a unique sanding fabric, known as "Gritcloth," which consists of an abrasive imbedded in a tough, open-mesh fabric that is said to hold the abrasive firmly but let the removed stock flow through the holes. The material, which is claimed to have an unusually long life, is available in all the finer grits suitable for smoothing surfaces on either metal or wood products. Either side of Gritcloth may be used wet or dry, flat or folded, on sanding machines or by hand. It is easily cleaned by rinsing in water.



Bay State "Gritcloth"

ROHCO Imperial Silver Brightener

ROHCO Imperial Silver Brightener, a product developed to give a lustrous satin finish for decorative and industrial silver plating, has been announced by R. O. Hull & Company, Inc., 1308 Parson Ct., Rocky River 16, Ohio.

The manufacturer states that this product is valuable in decorative work because the smooth and soft finish it achieves is excellent for filigrees and other recesses, and in many cases brushing can be eliminated. The addition of ROHCO brightener to the plating bath is said to improve covering power over lead alloys and to give better solderability.

The use of this brightener can increase industrial production two to three times with existing equipment, the company claims. Concentration of the brightener is not critical, and therefore uniform quality and color are easily achieved. The product is recommended for barrel and still plating of contact pins, complex electronic parts, soldered assemblies and other dissimilar metals, but not for exceptionally heavy silver deposits such as bearings.

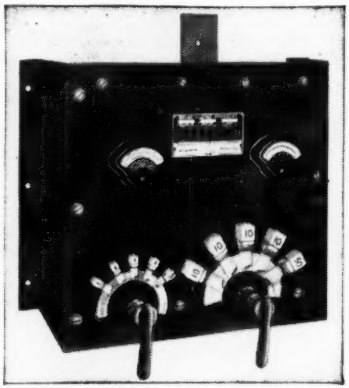
Belke Commutating Rheostats

Commutating rheostats, designed to provide close amperage regulation, have been developed by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Illinois.

In the 100 ampere rheostat illustrated, the left lever with circular blades selects any amperage from 1 to 9; the right lever any amperage from 10 to 90 in steps of 10. For rheostats of greater amperage, another commutating switch and/or regular knife switches are added to the 100 ampere controls.

The instrument can be furnished for ¼, ½, 1, and 5 ampere step regulation in required capacities.

Belke 100 Ampere Rheostat



Heil Heat Exchanger

An external heat exchanger for heating corrosive solutions has been developed by Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, Ohio. The manufacturer states that this double-pipe exchanger, No. 1251, makes possible added space in the plating tank in addition to more even distribution of heated solution and constant circulation.

Heil Heat Exchanger, No. 1251

Heating and cooling can be accomplished with the same unit. Tube materials available in standard designs include Nocordal* impervious graphite, nickel, stainless steel, carbon steel, and Carpenter 20. This variety of materials makes possible wide application in corrosive solutions and interchangeability of tubes, it is claimed.

An installation includes a one tube unit or a series ot one tube units which can be individually controlled.

Aget-Detroit Dust Collector

Aget-Detroit Co., 602 First National Bank Bldg., Ann Arbor, Mich., has added Model 30ND50 to its line of industrial dust and vapor collectors. Features of the unit are outside exhaust of cleaned air, and an over drive when used on electric power having frequencies of less than 60 cycles.

The duct collector has a rated capacity of 3,630 c.f.m. at 6 inch static suction on an 8 inch diameter pipe. It employs a standard size, pre-tested cyclone separator which removes the dust and dirt from the air and permits the discharge out of doors of the cleaned air, together with any toxic or objectionable fumes. A dust storage capacity of 12 cu. ft. is standard, but an extension or a hopper bottom can be provided for operations involving very large quantities of dust.

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* Trade Mark

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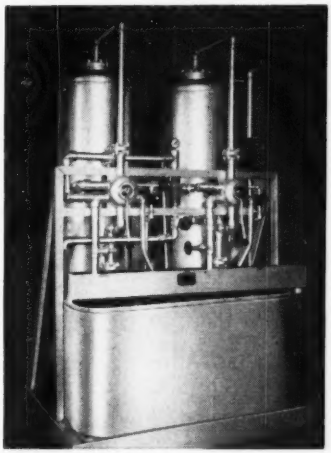

2-Bed Barnstead Demineralizer, 1000 gal. per hour, used in automotive plant

In rinsing, plating, make-up, anodizing, dye-baths, where mineral-free Pure Water is needed, manufacturers can save money, have fewer rejects, and get better product control by using Barnstead Demineralizers. Write for our Free Catalog #123.

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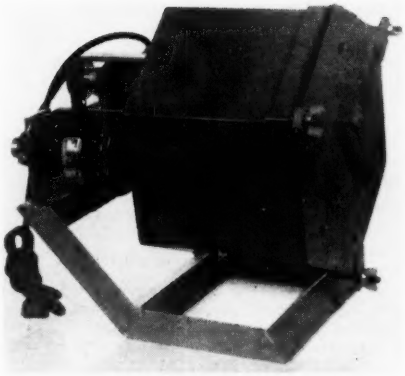
STILL & STERILIZER CO.
10 Lanesville Terrace, Boston 31, Mass.

Detrex 61

A compound designed especially for use as a pre-cleaner for steel that is to be deep drawn or extruded has been announced by the Detrex Corporation, Detroit 32, Michigan.

The compound, Detrex 61, used in a soak tank at approximately 190 deg. F. at a concentration from 6 to 10 ounces per gallon, removes oil, grease and dirt from all ferrous parts.

In addition to possessing high wetting and penetrating properties, Detrex 61 is said to be very free rinsing. The compound does not contain fatty acids or resin soaps and consequently any entrained solutions will not be left with scummy deposits on their surfaces, the manufacturer states.



Portable Bench Type Tumbler

Portable Bench Type Tumbler

Del's Tumbling Service (formerly American Plating Rack Co.), 232 N. Rosemary, Inkster, Mich., has developed a portable bench type tumbler with a leakproof front which is entirely removable.

Designed to bulk finish small parts, the machine can also be used to tumble individual pieces which would normally be too large or heavy to bulk tumble free floating. The compartment holds 2½ gallons of self tumbling work when loaded 60 per cent full. It is belt driven and rotates at 16 r.p.m. The compartment can be operated in either tilted or horizontal position and can be lined with rubber for bright finishing of metallic parts.

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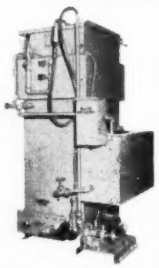

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DAyton 3-3900 - 1 - 2

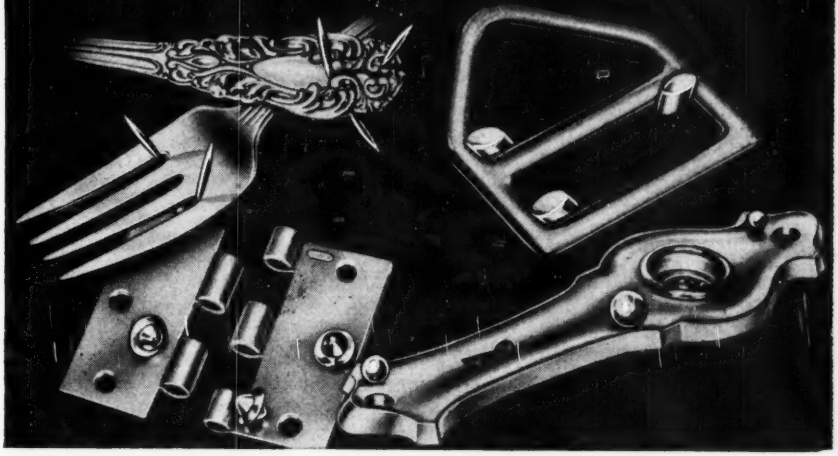
Nielco Conditioner for Ferrous Metals

"Ferr-O-Niel" 985 is a non-corrosive acid surface conditioner for ferrous metal parts and castings (including Meehanite and gray iron) developed by Nielco Laboratories, P.O. Box 4703, Detroit 19, Michigan.

Built from a phosphoric acid base, the conditioner is said to do a complete job of removing light oil, soil, normal oxides and smutt from finished steel parts and castings without changing the tolerances of the metal or building up hydrogen embrittlement. It should be used with three parts of water at a temperature not lower than 180 deg. F. Time required is three to five minutes.

The manufacturer claims that Ferr-O-Niel 985 is also effective in preparing gray iron castings for zinc plating and in preparation for barrel plating of machined steel parts, small stampings, castings, and high sulphur content steel.

in BURNISHING MATERIALS



it's the SHAPE that counts!

Thousands of small parts, stampings and castings are burnished for *Industry and the Armed Forces* with Abbott Burnishing materials. They're shaped to do the job *right!*

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Oakite Compound No. 31

A triple-duty prepaint cleaner which is said to clean, derust and phosphate metal surfaces in a single operation has been announced by Oakite Products, Inc., 120 Rector St., New York 6, N. Y. The compound is a highly concentrated liquid detergent which can be diluted up to 25 per cent by volume for prepaint treatment of metal by dipping or hand swabbing methods.

The manufacturer claims that in addition to removing light soils, soldering and welding fluxes, rust, heat scale, tarnish and other oxides, Compound No. 31 microscopically etches steel, cast iron, and aluminum and converts the surface layer of metal into a thin film of insoluble phosphates. This film improves the adhesion of paint to metal and also prevents the spread of rust when painted surfaces become scratched or gouged.

PRODUCT LITERATURE

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Continuous Airless Blast Cleaning is the subject of a bulletin (**No. 844**) published by the American Wheelabrator & Equipment Corp., 1155 S. Byrkit St., Mishawaka, Ind. Of particular interest to plants having the problem of cleaning relatively large tonnages of work on a production basis, the bulletin explains the process of continuous blasting and illustrates how it is being applied in actual practice.

Special Plating Processes. The Hanson-Winkle-Munning Co., Matawan, N. J., has released a revised condensed description of special H-VW-M Electroplating Processes. Bright plate, high-speed processes are described for the electroplating of cadmium, zinc, copper, nickel, and silver, together with information on improved methods for lead plating. For those interested in any particular process, there are technical manuals illustrating and describing the various processes in detailed form.

Mill-Rose Brushes. A four-page bulletin which lists 56 standard twisted wire brushes in the sizes most used by industry is available from The Mill-Rose Co., 1985 E. 59th St., Cleveland 3, Ohio. The single and double spiral brushes are designed for hand or power operation. The bulletin also includes some special sizes and shapes and lists hints which will prolong brush life.

Practical Methods in Heavy Industrial Nickel Plating. An eight-page illustrated booklet outlines the possibility of heavy electrodeposits for the salvage and repair of worn parts, the reclaiming of mismachined parts and for wear and corrosion resistant surfaces on original parts. Available from International Nickel Company, Inc., Dept. EZ, New York 5, N. Y., the bulletin discusses preparation of parts, baths, procedures, and potential applications.

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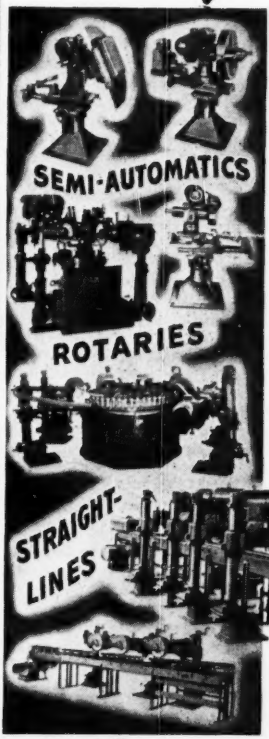

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It depends . . . on the size, shape and material of the part you want to finish; on production required; on plant space and layout. ACME Automatics include Straightlines, Indexing and Continuous Rotaries, with or without spindles. These machines are built in a variety of types and sizes and may be equipped with varied special fixtures and accessory equipment to meet the conditions involved in your specific job. ACME Automatics have proved their efficiency in production for nearly half a century. Progressive ACME experience in this specialized field is a substantial assurance of lower production cost and dependability under production operation in your plant.

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"Better, Faster Finishing for Production and Maintenance Jobs" is the title of a bulletin on industrial sanding applications published by the Pneumatic Division of Sundstrand Machine Tool Co., 2531 Eleventh St., Rockford, Ill. The colorful, informative bulletin **(No. 2109)** covers three major subjects—advantages of straight-line sanding action, illustrations showing how air sanders are used for a multiplicity of operations in the plant, and specifications on the four models of Sunstrand Air Sanders and Accessories.

Prufcoat Primers and Finish Materials. A four-page catalog which describes the entire line of Prufcoat Protective Coatings is available from Prufcoat Laboratories, Inc., 50 E. 42nd St., New York 17, N. Y. The bulletin includes case history studies of five different types of applications, and a three-point analysis of the advantages of maintenance painting done the Prufcoat way. The back page of the catalog, devoted to a listing and brief description of all eight of the company's products, is designed as a handy guide to choice of sealer, primer, and finish material required for any plating problem.

"Boy, was she ever burned up! How was I to know she'd use my dye formula for anodized aluminum in rinsing her hair."

Surface Tension Measuring Instrument. A four-page bulletin describing the Sur-Ten Meter, a device for surface tension measurements under production conditions, is available from the designer, Joseph B. Kushner, 115 Broad St., Stroudsburg, Pa. The illustrated pamphlet discusses the use of the instrument in electroplating and acid pickling, as well as in anodizing, chemical manufacturing, enameling, paint processing, and other fields.

Klem Strip-Aid, a non-toxic, non-flammable, non-corrosive supplement to alkaline stripper, is described in a four-page folder available from Klem Chemicals, Inc., 14401 Lanson, Dearborn, Mich. The illustrated pamphlet details the advantages Strip-Aid offers industry in speeding up the removal of paints, enamels, lacquers, and so forth, from conveyor hooks and equipment and from parts.

Alodizing with "Alodine." A four-page booklet, available from the American Chemical Paint Co., 1935 Spruance St., Ambler, Pa., discusses the protection of aluminum and gives detailed coating and process data on the principal types of aluminum. This booklet, revised March, 1952, describes the standard Alodine No. 100 and also presents data on a recently developed grade—Alodine No. 600.

Hellige Photoelectric Colorimeter and Turbidimeter. A leaflet which describes in detail the design and operation of the Hellige "Chromatron," an instrument for the electronic determination of color or turbidity of a liquid, has been issued by Hellige, Inc., 877 Stewart Ave., Gorden City, N. Y. Prices and models available are also listed.

Gardner Portable Glossmeter. A four page folder, illustrating and describing the Gardner Portable Glossmeter is available from Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda, Md. Features of the instrument, including the recently developed "behind the window lens," are explained and applications are suggested.

Industrial Gloves. Help in choosing the best glove for a specific job is given in a catalog released by Pioneer Rubber Company, Willard, Ohio. In addition to illustrations of the company's Stanzoil line of industrial gloves and aprons, the booklet includes check lists to help the manufacturer in selection of gloves. A performance data table evaluates neoprene and vinyl gloves when used in various chemicals and other substances.

Surface Conditioning Topics, is the title of a new quarterly magazine being published by Nielco Laboratories, P. O. Box 4703, Detroit 19, Mich., and available to any person interested in surface conditioning and/or corrosion control. Volume 1, Number 1 contains 16 pages and includes complete data on the Nielizing Corrosion Control Process as well as other material.

Coated Abrasive Belts. An attractive, colored booklet, illustrated with photographs and drawings, is being distributed by Dept. F.P. No. 1, Behr-Manning Corp., Division of Norton Co., Troy, N. Y., to describe the advantages of coated abrasive belt polishing methods. Title of the booklet is "How Polisher Pete Put Economy in Polishing."

Unichrome Selenium Rectifiers. A two-page leaflet which describes the design and advantages of the Unichrome dry plate rectifiers is available from United Chromium, Inc., 1700 East Nine Mile Road, Ferndale Station, Detroit 20, Mich. The range of the rectifiers, (250 to 10,000 amperes in steps of 250 amperes) as well as six other important features are listed and tabulated.

Kocour Automatic Dropping Unit. A leaflet which describes this instrument for determining thickness of cadmium, zinc, copper and tin deposits by the Hull and Strausser method is available from Kocour Co., 4800 S. St. Louis Ave., Chicago 32, Illinois.

With a fixed dropping rate of 100 drops per minute, the unit also has a counter to indicate the number of seconds elapsed.

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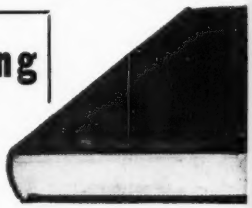
Modern developments in plating processes and methods



HERE are the basic theories and principles of electroplating—the practical methods and processes that are of invaluable use to everyone concerned with electroplating and electrotyping. The most efficient methods of making electrodeposits on more than 40 different metals, alloys, and plastics are summarized completely in this thoroughly revised and enlarged book.

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Completely revised to make it a more practical working guide, this book summarizes and digests the best of modern practice in the field. It covers qualitative, quantitative analyses of solutions; pickling, dipping; electropolishing; electroforming, electrotyping; producing phonograph record matrices, and manufacturing tubes, etc. Metals are dealt with in the same order as in the periodic system of elements.

(Please send check with order)

PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio

For more complete information on products and processes use READER SERVICE CARDS inside covers.

Mold Bases and Moldmakers' Supplies. A 144-page catalog has been published by the Detroit Mold Engineering Co., 6686 E. McNichols Rd., Detroit 12, Mich. The book includes all the new additions to D-M-E's service and features a complete line of standard mold bases and component parts along with a complete line of tools and mold polishing supplies. Products are illustrated in detail and prices are listed. The new features are aimed at making the catalog a working tool to help manufacturers make better products.

"Scientific Cleaning for Modern Metal Finishing" is the title of an illustrated brochure describing Kelite pH Control which has been published by Kelite Products, Inc., 1250 N. Main St., Los Angeles 12, Calif. Included are data on high speed phosphatizing; removal of heat treat scale by simple immersion in an odorless, non-flammable, non-phenolic liquid; advanced procedure for preparing die-cast parts for plating; and information on the removal of carbon, grease, dyes, or gums from aluminum, magnesium, cadmium, copper, zinc, die-cast, and ferrous metals by soaking in room temperature solutions. Each of the cleaning or processing techniques described can be achieved through the use of recommended compounds.

Bulletin **No. 121** discusses 23 other difficult cleaning or processing jobs with applications in most phases of the metal finishing industry.

Modern Masking Materials and Methods for Fabrication and Spray Finishing

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Written for department superintendents, shop foremen, process and finishing engineers . . . this manual is a source of ideas for saving time, cutting costs and getting better product quality.

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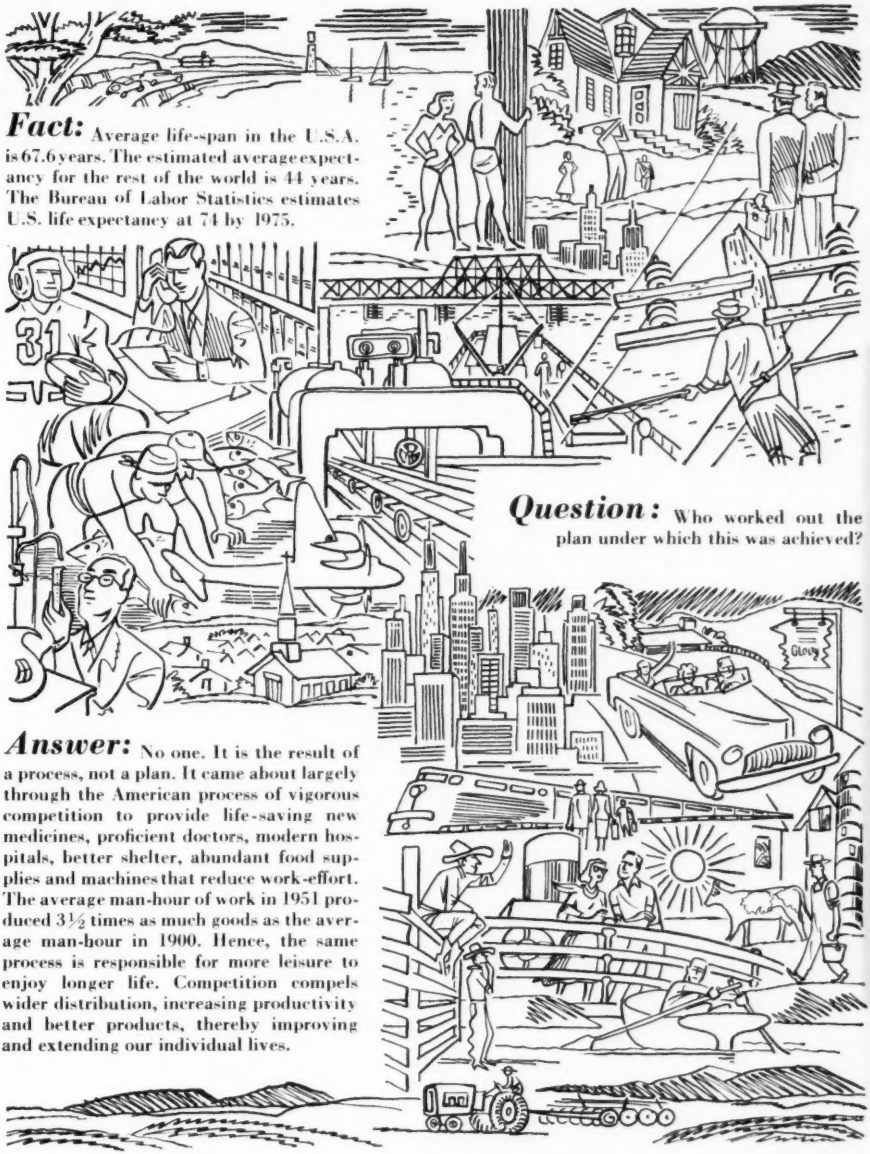
Specification Lacquers for Finishing Military Items. A handy guide to specification lacquers for finishing military items is available from Hercules Powder Co., Wilmington 99, Del. The first section of the leaflet enables suppliers of finishes to find out what kind of lacquer finishing material is being called for when all they have is a specification number. In the second section of the leaflet, the permissable or appropriate numbers are grouped according to use. In this section specification numbers for finishing such items as vehicles, aircraft, ammunition and components, furniture, and containers are included.

Wilbur & Williams Dampcoat Enamel. A brochure which shows 48 specialized-for-industry colors in Odor-Less Dampcoat Enamel is available from The Wilbur & Williams Co., 130 Lincoln St., Brighton 35, Mass. Instructions tell how to obtain any desired color by mixing white Dampcoat Enamel and the six deep tone colors in semi-gloss, gloss, or flat paint.

Hercules Neolyn Resins. A technical bulletin containing practical application data and starting formulations for the use of Neolyn resins in adhesives, plastics, lacquers, and organosols is now available from Hercules Powder Co., Wilmington, Del. Information about the general properties of Neolyns, the specific properties of each of the seven resins in this series, and performance characteristics are included in this 16-page, two color booklet.



Fact: Average life-span in the U.S.A. is 67.6 years. The estimated average expectancy for the rest of the world is 44 years. The Bureau of Labor Statistics estimates U.S. life expectancy at 74 by 1975.

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200 gallons No. 22178 Green
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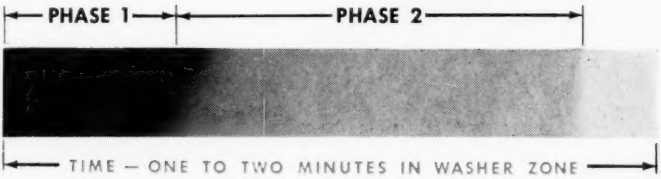
DETREX METAL CLEANERS



PHASE 1 — CLEANING

PHASE 2 — RAPID RATE OF DEPOSIT

DETREX 79 cleans and phosphate coats in one operation . . .

Detrex 79 is a dual-purpose compound that both cleans and phosphate coats.

Used in a spray washer, "79" produces a fine-textured, highly adherent phosphate coating on steel and cast iron parts. This coating provides a rust-resisting surface that gives excellent adhesion for paint finishes.

Detrex "79" is economical to use and requires no special equipment. Cleaning *and* phosphate coating of ferrous metals is done in a single stage of any standard two- or three-stage washer. Work comes out of the washer clean and with a phosphate-coated surface that dries to a uniform gray mat finish.

A trained Detrex field engineer can show you the advantages of 79 and other Detrex phosphate coatings in your plant. If a new operation is being considered, he can also give you recommendations on equipment . . . for, you see, Detrex offers you the "one-source" advantage of cleaning compounds *and* processing equipment.

For complete information or free consultation service, write to **Detrex Corporation, Box 501, Detroit 32, Michigan.** A-3

DETREX CORPORATION

DEGREASERS • DEGREASING SOLVENTS • WASHERS
ALKALI & EMULSION CLEANERS • DRYCLEANING EQUIPMENT
PHOSPHATE COATING PROCESSES